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The Iron Age

NATIONAL METALWORKING WEEKLY • SEPTEMBER 2, 1954

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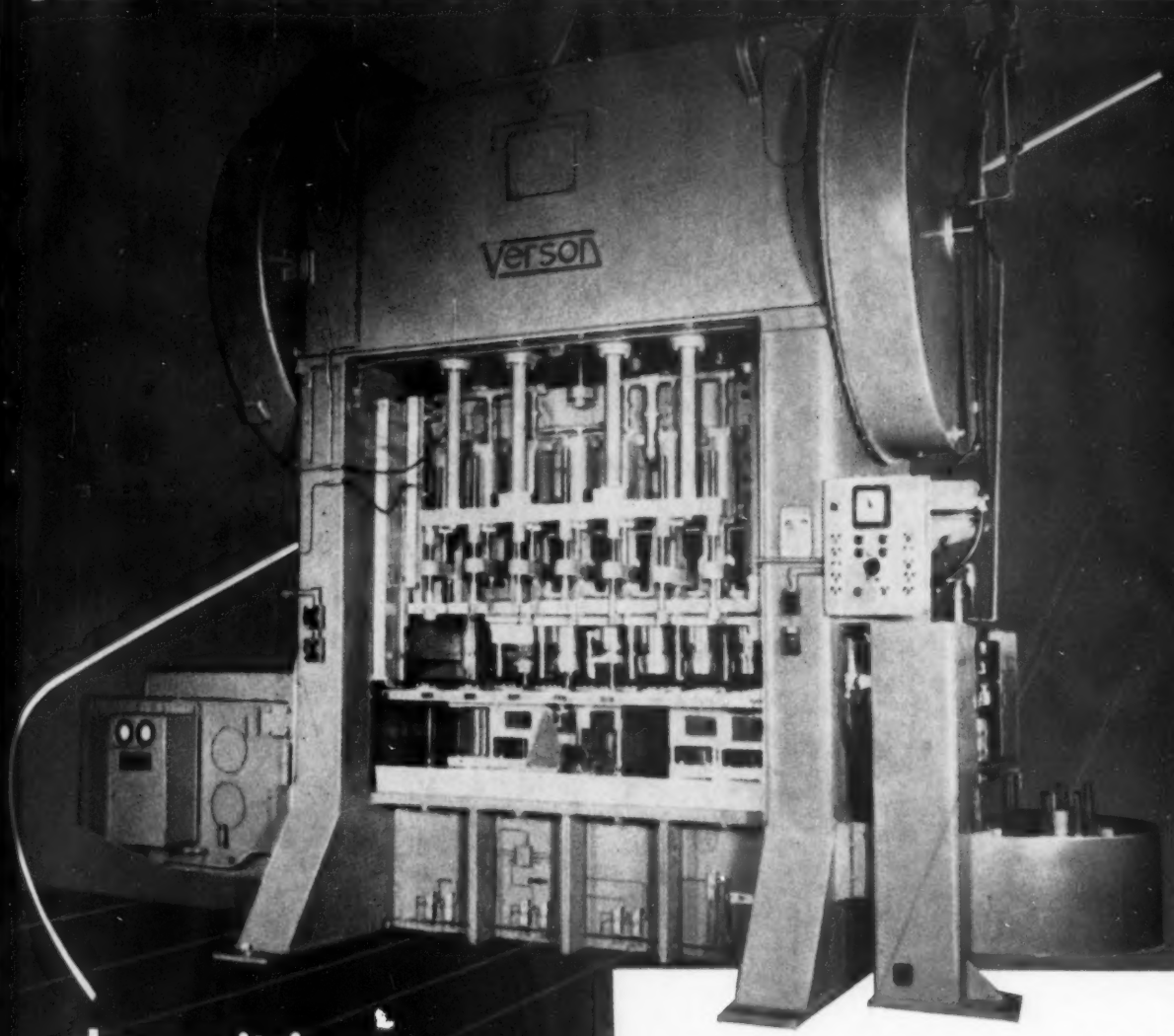

...key unit in a Verson TOOL-UP for producing 2000 motor housings per hour

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REFRACTORIES

Only through extensive, modern production facilities and by continued product development can we furnish the steel industry with a dependable supply of granular basic refractories—premium products at competitive prices.

BASIC REFRACTORIES INCORPORATED CLEVELAND 15 OHIO

Tests for Determining Mechanical Properties of Alloy Steels

This is the sixth of a series of advertisements dealing with basic facts about alloy steels. Though much of the information is elementary, we believe it will be of interest to many in this field, including men of broad experience who may find it useful to review fundamentals from time to time.

The types of tests used to evaluate the mechanical properties of an alloy steel depend upon the end use of the steel involved. Generally speaking, mechanical properties are determined by tension, bend, and hardness tests, and by a group of special tests employed on tubular and wire products. These are discussed briefly in the following paragraphs.

(1) Tension tests provide means of determining tensile strength, yield point, yield strength, proof stress, proportional limit, per cent elongation, and per cent reduction of area. This sort of test subjects the steel to stresses resulting from the application of an axial tensile load to the specimen ends, the load being sufficient to rupture the specimen.

(2) Bend tests often aid in determining the ductility of steel. The severity of such a test depends largely upon the bending radius used. Several factors influence the length of radius, including thickness of the test specimen, width of test specimen, direction of test, chemical composition, tensile strength of specimen, etc.

(3) Hardness tests determine the steel's resistance to penetration. This characteristic is most commonly measured by the Brinell Test or the Rockwell Test. In the former, pressure is applied to the surface of a test specimen by means of a ball 10 mm in diameter. Two diameters of the resulting impression are measured and averaged, the average being used to determine the hardness number by means of a conversion table. In the Rockwell Test, the degree of hardness is read on a gage; hardness is measured by the penetration of a diamond point or a $^1/_{16}$-in. steel ball. Rockwell "C" scale readings are used in connection with the diamond point; "B" scale in connection with the steel ball. The "C" and "B" are the most commonly used of the several Rockwell scales.

(4) Special additional tests are often made on tubular and wire products. These include such items as hydrostatic and manipulating tests, and torsion and wrapping tests, the latter two being used only with wire.

The subject of testing and its relationships to the end uses of alloy steels has been given broad study by Bethlehem metallurgists. If you desire, they will be glad to discuss any phase of it with you, and also give unbiased opinions on such matters as analysis, proper selection of steels, machinability, etc. Call for their services at any time.

And when in the market for alloy steels, remember that Bethlehem can furnish the entire range of AISI standard analyses, as well as special-analysis steels and all carbon grades. Your inquiries will be welcomed.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.
On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM ALLOY STEELS

BETHLEHEM STEEL

the Iron Age

Vol. 174, No. 10, September 2, 1954

DIGEST OF THE WEEK IN

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Address mail to 100 E. 42 St., N. Y. 17, N. Y.

NEWS DEVELOPMENTS

TV CABINET MAKERS SWING TO STEEL — P. 55

After 3-year hiatus the sheet steel television set cabinet comes into its own. Five biggest TV makers have switched over from wood and plastic for cabinets of low and medium-priced sets. Lack of public acceptance was the big barrier to earlier use of metal. All makers will get on the steel cabinet band wagon. Steel cuts cost, will reduce prices. One maker estimates his cost at $1.56 per small cabinet.

WELDED WIRE FABRIC GAINS IN ROADWORK — P. 56

Welded wire fabric has long shown its worth in highway and building construction. But use has been sparing. Salesmen today are eagerly eyeing new markets that could boost consumption as much as six times. It costs more but roads last up to 70 pct longer. Several recent, large jobs have given the industry a big boost, and sales are on the way up.

IS SPAIN NEW SECRET WEAPON FOR U. S.? — P. 63

Indication is U. S. plans to use Spain as a combination arsenal-supply base in event of war in Europe. U. S. would make use of Spanish-made light artillery and ammunition. U. S. aids Spain's aircraft industry.

EASE EMBARGO ON EXPORTS TO EAST EUROPE—P. 65

Commerce Dept. and Foreign Operations Administration have allowed shipment of non-critical items by U. S. and allies to Russia and satellites. Also, U. S. firms no longer need licenses to export to friendly nations. The critical list has only been cut, however, not abandoned. Only slight effect predicted.

1955 CARS START NEW MODEL CYCLE — P. 76

Automotive Big Three are unanimous in completely restyling their low and medium-priced lines this year. Tough competition of today's buyers market forces more frequent complete body-style changes, makes more complete yearly "face lifting" a must.

SEE EASIER DEFERMENT OF KEY PERSONNEL — P. 81

Industry may soon find it easier to obtain draft deferment of key people. Reason: new government studies show ample manpower will be available. But draft easing is contingent on international outlook.

IN METALWORKING

ENGINEERING & PRODUCTION

ANALYSIS OF PARTICLE SIZE DISTRIBUTION — P. 99
Control of particle size distribution determines quality in many products made from powdered materials. Now, with a new analyzing instrument, this distribution can be determined more rapidly and more accurately for particle sizes from 1 to 250 microns.

THREE NEW HARD SURFACING DEVELOPMENTS—P. 103
Three new developments—equipment for oscillating a welding head, a simpler method for adapting heads for multiple arc welding, and use of agglomerated alloy fluxes—have been united into one process to produce high-quality, low-cost hard surfacing deposits. Combined with the advantages of submerged arc welding, they are used for rebuilding worn equipment and for applying hard surfaces on new equipment.

NEW TEST GIVES BOND LIFE EXPECTANCY — P. 106
Deterioration of the bond between layers of some bimetallic materials can severely limit their service life. Tests have now been devised to determine and lengthen the life expectancy of these materials.

DIE CASTING PLANT FEATURES ECONOMIES — P. 108
A new die casting plant now in operation features economy, safety and high-quality volume production. Low frequency induction furnaces have replaced gas-fired types for melting and holding. Bucket conveyors carry castings, gates and sprues to melting, casting and cleaning departments.

HIGH SPEED TECHNIQUES BOOST SWAGING USE—P. 112
Uses for rotary and press-types swaging machines keep growing as equipment becomes faster, more efficient. Improved die designs and use of automatic feeding and indexing devices give high volume output.

MARKETS & PRICES

STAINLESS STEEL STARTS TO COME ALIVE — P. 57
Stainless steel producers are happily noting a slight quickening in order tempo, but they cautiously refuse to label it a trend as yet. Some believe that a slight quickening in stainless strip is the beginning of auto buying. But improvement is spread over broad range of consumer industries, with flat-rolled steel products making best showing.

TOOL ORDERS REFLECT DEEP SUMMER SLUMP — P. 87
New orders for machine tools skidded sharply in July, touching their lowest level since the Korean emergency began in June, 1950. Builders put biggest share of the blame on trend toward plant-wide vacations.

IS THE STEEL MARKET UPTURN BEGINNING? — P. 149
Although it isn't showing yet in production schedules, there has been a slight upturn in steel orders during the past few days. Could this be the beginning of the upturn that has been long predicted? Chances are it is, although steel producers are far too cautious to say so definitely. The significant thing is the improvement is without new auto buying.

STEEL MARKET FEELS AN UPWARD NUDGE — P. 151
Galvanized sheets are still going strong. Pickup for stainless is reported from all centers. Bars are up in some markets, down in others. Structurals running fair to good in all markets. Oil country demand still strong but rush has eased. Wire past seasonal peak.

TIGHT COPPER MAY BE STRIKE RESULT — P. 152
Settlement of Kennecott Copper strike was good news to copper users—but all is still not well. Strike hit consumers when inventories were already low. Rush of orders has depleted September supplies, and output lost during the strike will make metal hard to come by in October.

NEXT WEEK:

PREVENT STRESS CORROSION CRACKING IN ALUMINUM
Susceptibility of some aluminum alloys to stress-corrosion cracking can often be eliminated by removing one of the conditions, either stress or corrosion, which leads to failure. Where stress conditions cannot be altered, parts must be treated to protect the metal from corrosion.

COMPACT RADIOGRAPHIC INSPECTION SETUP IS SAFE
Fitting radiographic inspection facilities into a limited area has been successfully accomplished in one casting plant. Radiation sources are a 250 KVP X-Ray machine and a 380 millicuries cobalt-60 isotope. These are placed one overhead and one underground in a 17 x 14-ft exposure room.

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Type SC-1-2—a double drum Jeffrey-Steffensen Magnetic Separator used for finishing concentration work in magnetite and taconite plants.

Twenty years of concentrated research and improvement, following the development of a Steffensen counter flow magnetic separator, have given Jeffrey world leadership in the drum-type wet magnetic separator field. Jeffrey units are rapidly replacing other types in all industries where more efficient magnetic separation is required.

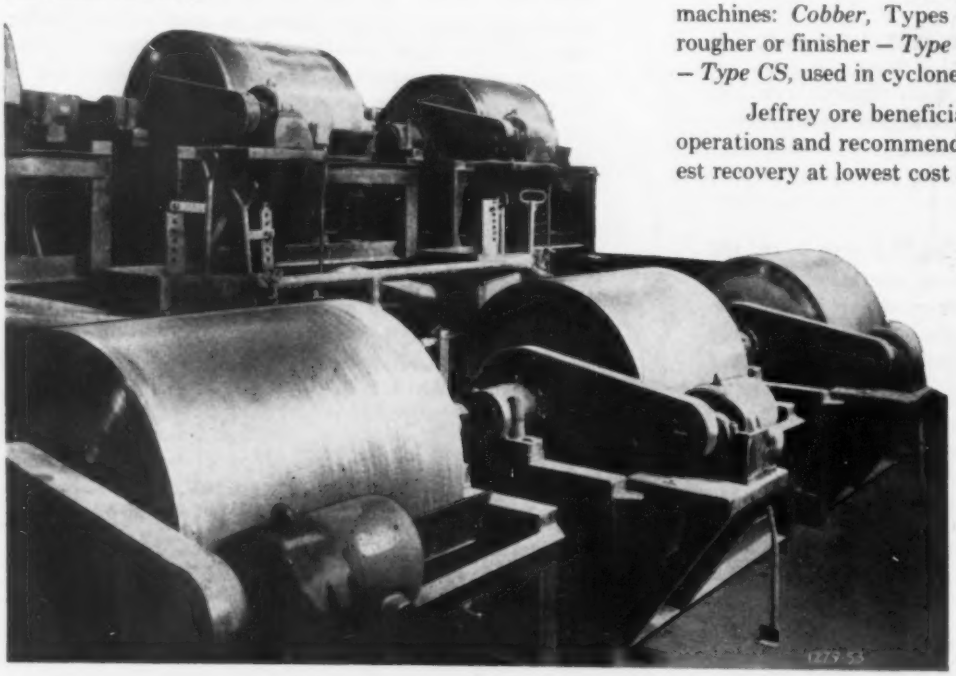
These units pay big dividends in concentrating magnetic taconite and magnetite, and in recovering ferrosilicon and magnetite media used to concentrate other minerals.

Simplicity of design and construction cuts maintenance to a minimum, yet this simplicity gives maximum magnetic recovery.

A typical Jeffrey magnetic separation improvement is the new-type coil. During recent laboratory tests this coil was submerged 120 hours in water dosed with all the chemicals found in hardest water used at mining operations. Under direct current power, the coil gave no evidence of grounding.

Jeffrey manufactures four basic magnetic separation machines: *Cobber,* Types C and S – *Steffensen,* used as rougher or finisher – *Type CO,* used in heavy media plants – *Type CS,* used in cyclone process heavy media plants.

Jeffrey ore beneficiation engineers will study your operations and recommend the ideal installation for highest recovery at lowest cost at your plant.



This battery of six Type CO-1 Jeffrey Magnetic Separators has been recovering ferro-silicon at a Minnesota iron ore heavy media plant for more than two years.

WRITE FOR TECHNICAL DATA

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IronAge

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Indexed in the Industrial Arts Index and the Engineering Index.

BPA NBP

Editorial:

Neither Prince Nor Pauper

ECONOMISTS, businessmen and statisticians have had their eyes glued to the steel ingot rate this summer. When they saw rates ranging from 62 to 66 pct of capacity they may have placed too much gloomy emphasis on the steel picture. It is no wonder that many were surprised at the good earnings for the second quarter among firms which were not expected to do so well.

The steel industry has gone through many changes in the past 20 years. No longer do steel firms introduce nonsensical and chaotic price-cutting when the going gets rough. It is no longer an industry that has little knowledge of its costs and its markets. The day has passed when steel firms froze in their tracks because of what their big customers (like automotive and construction) thought or said about them. There was a time when such customers played the tune to which the steel firms danced. Equal respect best describes today's relationship.

Earlier this year the steel rate—which is no longer a good criterion of what's going on in the industry—was higher than it was this summer because steel firms were digging into backlogs. In the second quarter the rate had been cut to fit the cloth and was about equal to incoming business. Recently the volume of new business is upward again after a summer filled with inventory cutting and mass vacation shutdowns among steel users.

This fall the steel rate will climb to a range of 72 to 76 pct—and maybe higher. That is not bad when you remember that today's capacity is geared for an all-out war; or when you recall that steel leaders will have to keep a cushion of at least 15 to 20 pct of capacity over and above civilian requirements. Such leeway is looked upon by today's steel management as a basic defense responsibility and a common sense must.

Steel management has learned to merchandise its products. Filling a mill schedule at a loss just to turn over the mill is no longer considered good business. Today steel leaders see no reason for being in business except to make a fair profit.

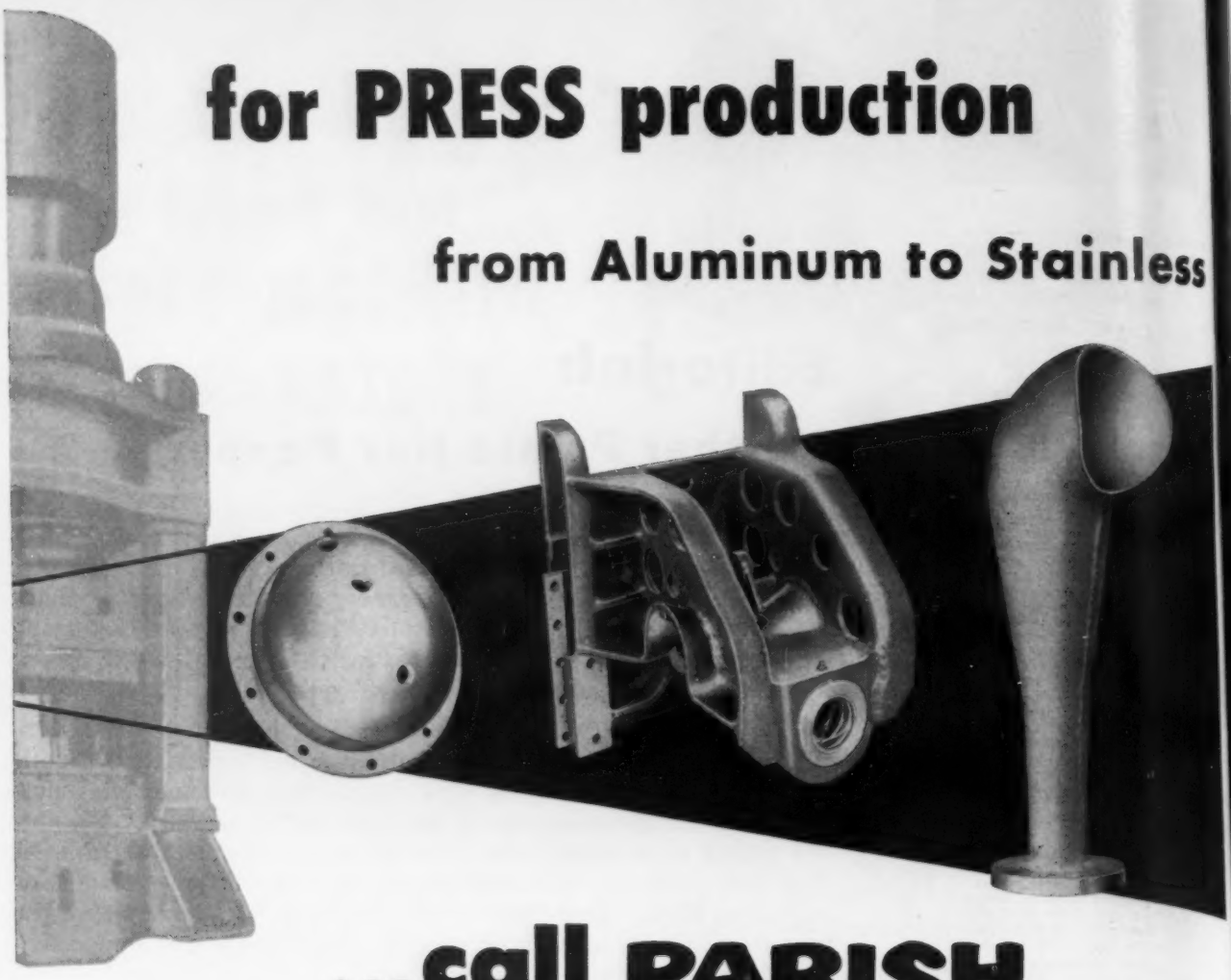
Steel is no longer a pauper or a prince. It is a basic industry important to other industries and to the country. It has matured to a far greater extent than its critics know or will admit.

Tom Campbell

EDITOR

for PRESS production

from Aluminum to Stainless



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When you need parts of any analysis—aluminum, carbon steel, high tensile steel, heat-treated alloy steels, or stainless—big parts or small ones, simple or complex, bolted assemblies or weldments—your best bet is Parish.

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dear editor: *letters from readers*

New Format

Sir:

Your new "Iron Age" format and type is very easy on the senses. You and your staff are to be highly complimented on the objectivity of your approach to reader comfort . . . *J. C. Sears, Executive Secretary, American Gear Manufacturers Assn., Washington.*

Surface Coating

Sir:

In the Aug. 12 issue of THE IRON AGE Newsfront we have noted a paragraph to the effect that one aircraft plant has developed a surface coating which inhibits scale formation on titanium.

It would be appreciated if we could have more information regarding this. *S. A. Fronek, Assistant Works Manager, Crucible Steel Co. of America, Pittsburgh.*

More information can be obtained from Boeing Airplane Co., Seattle.—Ed.

Chromium Plating

Sir:

Will you please send me ten copies of "Chromium Plating Properties" as found on p. F-34, Table 25, of your July 29 issue. *E. S. Penczek, Materials Engineering Dept., Stromberg-Carlson Co., Rochester, N. Y.*

Precision Casting

Sir:

We believe the article entitled "Cut Tool Costs, Simplify Design with Precision Casting" which appeared on pp. 136-139 of the Feb. 11 issue, will be of special interest to our manufacturing subsidiaries which comprise the foreign manufacturing units of the I.T.T. System.

With your permission, we propose to reproduce this article by photo-offset showing line credit, to enable distribution to key engineering and manufacturing personnel in our organization. *C. C. Comstock, Engineering & Manufacturing Div., International Standard Electric Corp., New York.*

Read Abroad

Sir:

We were most interested to read in your issue dated June 17 the technical article entitled "Mill Gives Dornin Process First Big Test." We should very much like to publish extracts of this article, including the diagram, in The Metal Bulletin, giving full credit to your publication and to the authors, of course. *H. G. Cordero, The Metal Bulletin, London*

Radiation

Sir:

The Aug. 19 edition of IRON AGE carries an article "How Radiation Affects Structural Metals" by C. P. Sutton and D. O. Leeser.

I would appreciate receiving tear sheets of this article, if available. *H. M. Neuhaus, Technical Assistant to the Director, U. S. Navy Shipbuilding Scheduling Activity, Philadelphia.*

Tinplate Demand

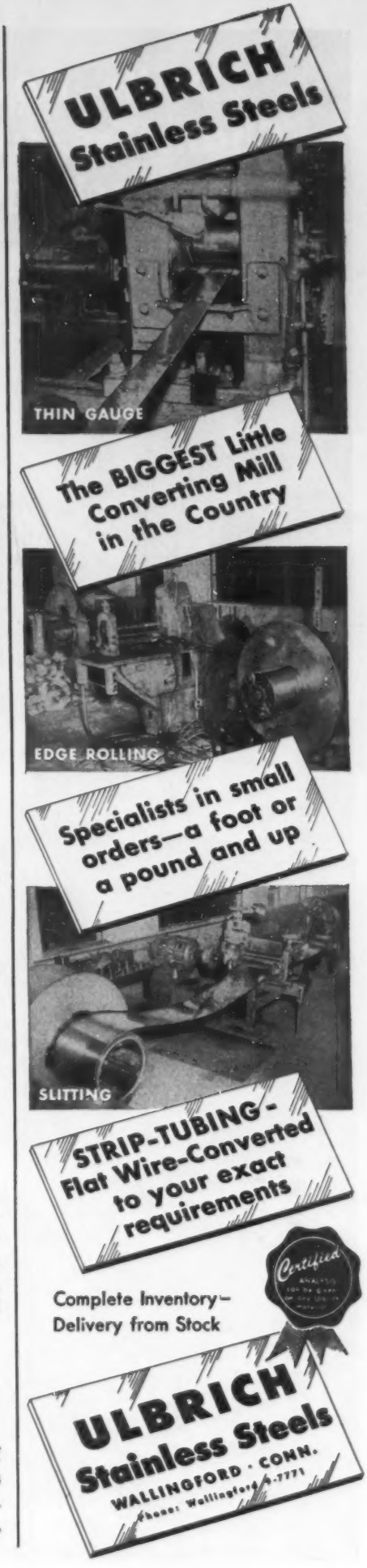
Sir:

I should like to have four copies of the article "Tinplate Demand Outruns Supply" which appeared on p. 91 of your July 22 issue. *D. Knox, Applications Engineer, Industrial Nucleonics Corp., Columbus, Ohio*

Improved Coke

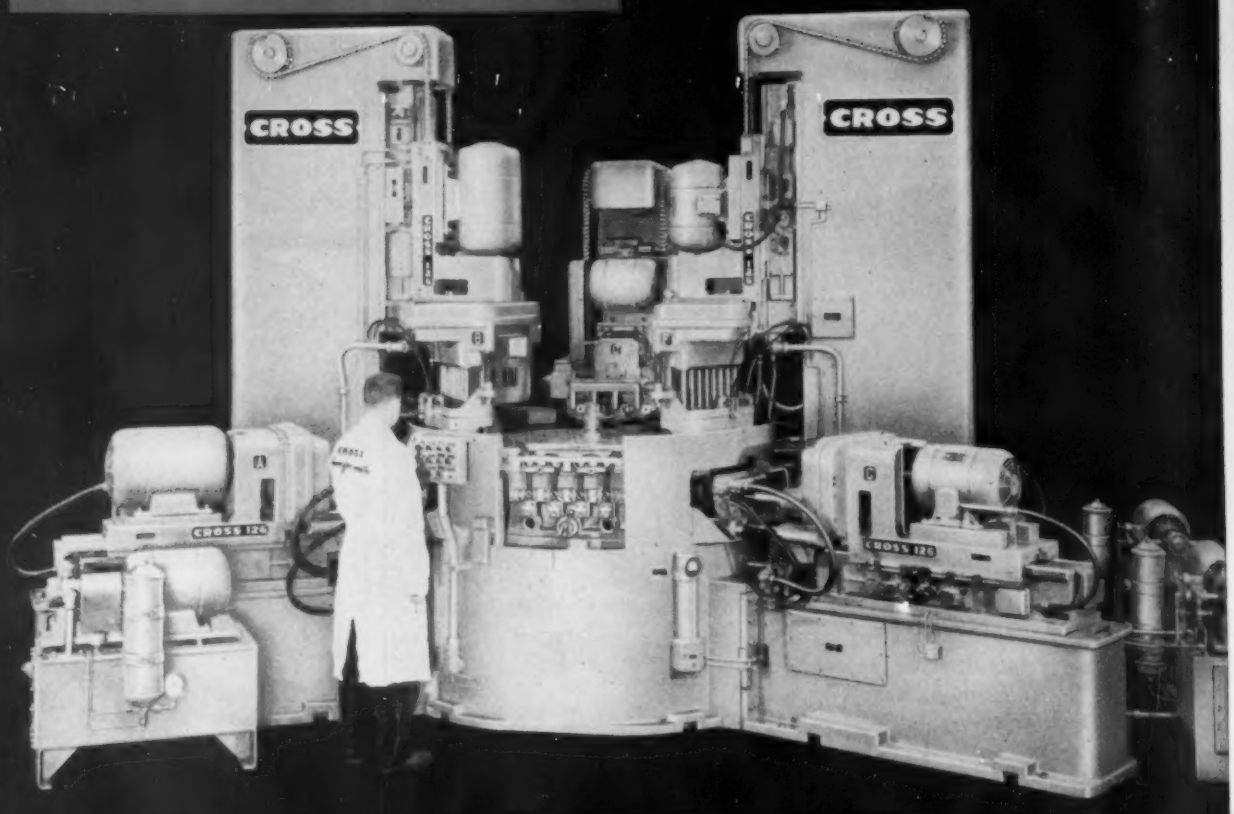
Sir:

I would appreciate two copies of the article "Improved Coke Cuts Cupola Operating Costs" in the Aug. 5 issue. *W. Amsbary, Metallurgist, Ohio Brass Co., Mansfield, Ohio*



Drills, Reams, Chamfers, and Mills Connecting Rods

Another Special by Cross



- ★ 450 pieces per hour at 100% efficiency.
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Established 1898

THE CROSS CO.

DETROIT 7, MICHIGAN

Special MACHINE TOOLS

Fatigue cracks

by William M. Coffey

September Lineup

September is Child Foot Health Month . . . and what's more significant, *Old Stove Roundup Month*, too. Day by day and week by week it looks like this:

Sept. 11-20	**National Tie Week**
Sept. 12-19	**Millinery Week**
Sept. 12-19	**National Doll Week**
Sept. 13-19	**Lessons in Truth Week**
Sept. 15	**Felt Hat Day**
Sept. 16-25	**Home Fashion Time**
Sept. 25	**National Kid's Day**

We can understand all but Lessons in Truth Week. How to celebrate it? Might wreck the whole world.

New Books

. . . and again our regular book review feature. Here are the latest offerings from the Federal Government.

POLLUTED WATER IS ALMOST AS BAD AS NO WATER—brings home sharply that dirty water is not so clean as clean water. Or that the best way to fly is in a plane.

HOW CHILDREN AND TEACHER WORK TOGETHER—explains how necessary it is.

ENAMELED CAST-IRON PLUMBING FIXTURES—describes minimum requirements for manufacture, inspection, types, sizes and test methods for bathtub stoppers.

Coming Attraction

Mark September 30 on your calendar. And make certain you still are a member of good standing in THE IRON AGE Club, all dues paid up.

. . . because our Sept. 30 issue will be devoted to the growing Powder Metallurgy industry, the industry that is giving such great competition to die casting, screw machinery, stamping and other precision metal forming methods. Included will be these articles:

Industry and Analysis and Forecast . . . Case Histories . . . Handbook of Metal Powder Terms . . . Trends and Advances in Powder Press Design . . . Tooling for Powdered Metal Parts . . . How to Get the Best Results From Sintering Furnaces . . . Production of High Density Powdered Metal Compacts.

Another job well done by your treasury men in action.

Puzzlers

The answer to Charlsie's coffeetime puzzler is 5 hours, Aug. 19 puzzler. Winners are E. K. Bechtold, James W. Mull, Jr., Miles A. Powell, George Ellis and Hope Lewis.

New Puzzler

Three thieves with a monkey for a mascot steal a quantity of bananas. It being late they decide to sleep and divide the loot in the morning. While the others are asleep the first thief arises and divides them equally with one left over, hides his share, leaves the rest in one pile, but gives the remaining one to the monkey, then he retires. Likewise, the second thief arises, divides the remaining pile equally, takes his third and gives an extra to the monkey and then retires. Later the third thief arises, divides the pile equally, with one remaining, hides his share, gives the extra to the monkey and he retires. In the morning all three arise, again divide the by now greatly diminished pile equally with one left over for the monkey and go their separate ways.

What is the smallest quantity they could have had before any division? How many did each party eventually wind up keeping?

Our thanks to Mr. John R. Ellison for this.

Precision Engineering takes place on

- For LAYOUT, INSPECTION, CHECKING, LAPPING, ASSEMBLY AND WELDING

CHALLENGE Semi-Steel LAYOUT SURFACE PLATES

High compressive strength · · · *Low* coefficient of expansion. 16 standard sizes, 6" thick - other sizes to order. Also available for sectional assembly into unlimited sizes. Precision ground or planer finished.

CHALLENGE WORK BENCHES

Four sizes. Cast iron top, 2-in. thick. Welded steel supports, tool box shelf, steel drawer with pilfer-proof lock.

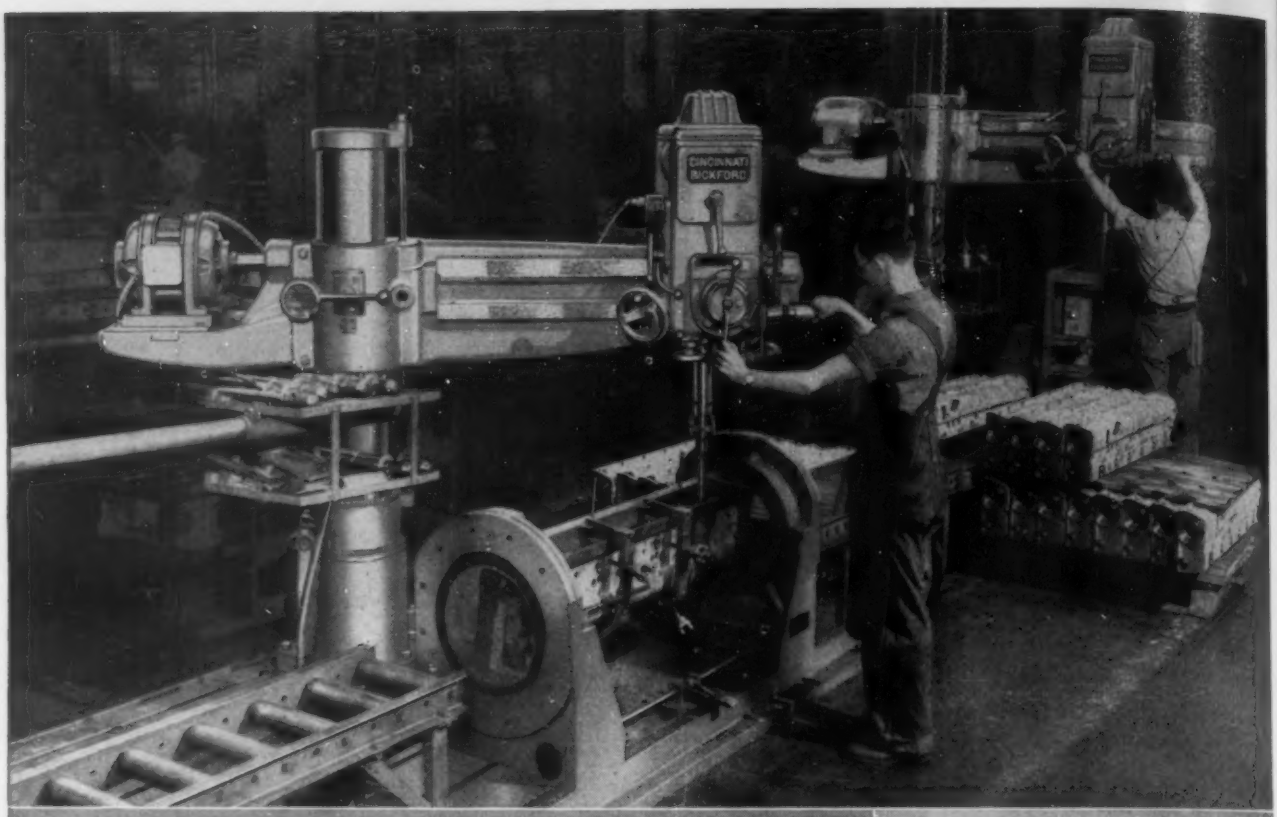
Other Challenge products include Clamp Edge Layout Plates · · · Reading Tables · · · Lapping Plates · · · Welding Tables · · · Surface Plates · · · Bench Plates and Surface Plate Equipment. The entire line is pictured and described in Challenge's latest catalog. Send for free copy, today!

Challenge

TRADE-MARK ® 769

THE CHALLENGE MACHINERY CO.

Office, Factories and Show Room: Grand Haven, Mich.



3 years of operation with NO MAJOR MAINTENANCE . . .

Photos courtesy Caterpillar Tractor Co., Peoria, Illinois.

Camshaft Housings for new Caterpillar DW21 Wheel-type Tractor illustrated in insert picture, showing casting before and after drilling operations.

The performance of Cincinnati Bickford Super Service Radial Drills at Caterpillar Tractor Co. has been outstanding, steady and trouble free.

On this job, including drilling, tapping and reaming, 116 holes are produced, 14 are reamed within .0005" tolerance. Caterpillar Tractor Co. also states Cincinnati Bickford Super Service Radial Drills have contributed to the advancement of their product.

Write for Catalog R-21-C.

80 YEARS OF SERVICE

CINCINNATI BICKFORD

RADIAL AND UPRIGHT DRILLING MACHINES

THE CINCINNATI BICKFORD TOOL CO.

Cincinnati 9, Ohio, U.S.A.

The Iron Age Newsfront

Shell Molding for Small Foundry

A new shell mold and shell core-making machine has been developed primarily for the small and medium-sized foundry. Cost of the smallest machine is under $1400. Both shell molds and cores can be made on the same unit, and simultaneously if desired. Patterns made on this equipment can be used on high production molding machines.

Trend to Steel TV Cabinets

Switch to steel cabinets for television sets is growing. One firm since last April has put 80 pct of its production into steel cabinets. Another has discontinued its plastic line entirely, while a third was expected to announce a change to steel cabinets this week.

Mechanism Lowers Radiation Hazard

Radiation hazards involved in radiographic inspection have been greatly reduced in one plant through the use of an unusual handling mechanism. Capsule containing radioactive cobalt 60, stored in a separate room, is brought into working position by a hydraulic linkage operated outside the room.

Rails Use More Roller Bearings

Roller bearings used in U.S.-built freight cars rose from a total of 39 in 1940 to 9570 at the end of 1953. During the same period passenger car applications went up from 4200 to nearly 16,000.

Navy Develops New Drive Gear

Development by the Navy for efficient performance at low speed is a pneumatic angle drive gear with a 212 to 1 ratio. Producing a superior drive with a spindle speed of 10 to 20 rpm, the new drive is substituted for the normal spindle of a corner drill.

Price Break in Low Alloy Steels?

Recent flurry in purchasing of alloying elements is not being matched by an increase in low alloy steel sales. Price pressure is mounting with some informed sources predicting a price break in the near future.

Need for Heavier-Walled Tubing

Tremendous depths and severe corrosion problems encountered in drilling for tidelands oil is bringing on the development of heavier-walled special seamless tubing. Specialty mills are expected to get bulk of new tonnage.

Prefer to Change Quoting Method

Some progressive steel officials would like to break away from archaic and confusing (to the public) methods of quoting prices such as base box, base column, discount from base. However, they refrain from discussing the subject with other firms lest they become suspect of illegal price collusion.

Bright Outlook for Helicopters

Helicopters for passenger service may do even better than their advance billing. Eastern Airlines is ready to spend $50 million on them as soon as they are available. Major deterrent is high backlog of military orders which is currently running far ahead of industry capacity. Regularly scheduled passenger flights in 30 to 50 seat models are expected by about 1960.

Reports Aid Sales Competition

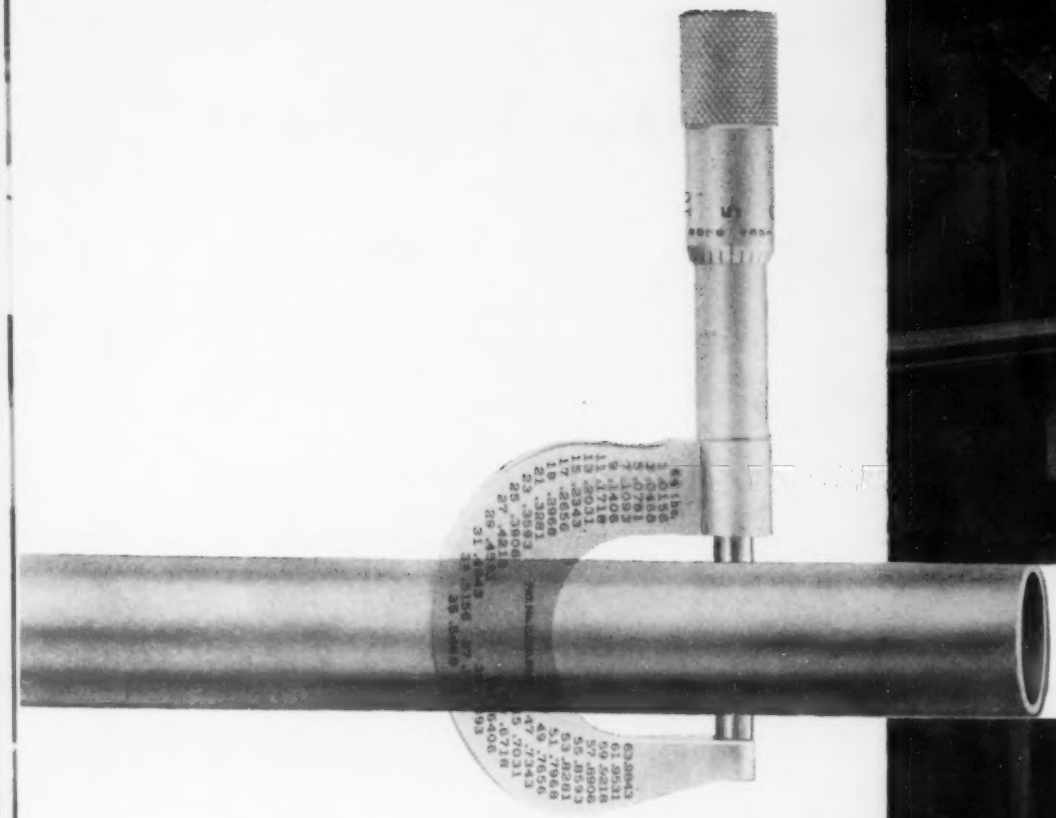
Clerical efficiency is playing an important part in steel companies' competition for sales. At least one large company is able to compile consolidated reports which show sales volume on a day by day basis.

New Ceramic Coating

A new ceramic undercoating with stronger bonding properties for high temperature applications will be announced shortly. The coating has so far proven out in jet engine applications.

Justice Dept. Continues Probe

Contrary to some general skepticism the Justice Dept. is thoroughly probing all points that might lead to an anti-trust action against General Motors. Sources working on the case, however, believe it unlikely that enough evidence will be established for a court case.



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TV Cabinet Makers Tune In On Steel

Major television set makers swing to steel for table model cabinets . . . Cuts costs, prices . . . Major factor in Raytheon's 400 pct sales rise . . . Most makers use 1010 C-R sheet—By K. W. *Bennett*.

♦ AFTER THREE YEARS of waiting in the wings, the steel television cabinet has arrived in 1954, will continue to move towards the center of the stage through the remainder of this year. If the signs are right, the increased use of sheet steel for television sets is long range, after a sharp climb in second half 1954.

An IRON AGE check indicates that of first five television set builders, five are in production on steel TV cabinets. As of December last year, only two of the five were building steel cabinets. All five are expanding output during the latter part of 1954.

Steel television sets as such are not new . . . Philco and RCA have been offering them since the opening of the 1950's. What is new is the surge in consumer acceptance, the massive increase in manufacturing capacity to produce these cabinets.

Steel Spurs Sales

RCA and Philco, giants of the industry, began early, and the results weren't too happy. But the trend started to reverse late last year. At that time, Westinghouse began mass production of sheet steel cabineted sets. So encouraging were initial results that Westinghouse was ready to announce a complete line of eight models, all with steel cabinets, at Chicago in June of this year. They'll be on dealers' floors in quantity this fall.

Meanwhile at Chicago, Raytheon, normally taking about 1 pct of total U. S. television set sales, announced a steel cabinet line in April, by June had captured 5 pct of industry sales, was 400 pct ahead of June '53 sales in June '54. Raytheon attributes some of the increase to beefing up of its distributor system, more of it to public acceptance of low-priced steel cabineted TV sets.

Big Four Switch

Motorola, also at Chicago, was producing metal cabinets in January. They aren't releasing figures, but it's known that there are no plastic sets on the Motorola lines at present, despite the fact that the firm was one of the pioneers in, and large users of, the plastic TV cabinet. Present materials are masonite, steel and wood.

With Philco, RCA and Motorola, Admiral Television constitutes the fourth member of TV's big four. Admiral within 2 weeks will be announcing a steel cabinet TV set that is smaller, lower in price, lower in cost.

STEEL CABINET of Raytheon's new TV set comes in eight colors or woodgrain and leather effects.

Zenith was producing steel TV cabinets in quantity by July 15 of this year. Rumors that Crosley will bring out a steel cabineted set this year are hot, seem to have good foundation. Stewart-Warner doesn't have a set in production, but is known to have completed a cost study on the steel cabinet.

$1.56 per Cabinet

The movement is widespread, firm, and still developing. One producer is now putting 80 pct of his output into steel cabinets, and figures a $5-$7 savings per cabinet. He is doing a booming business. Another is currently putting 25 pct of his manufactured TV chassis into steel cabinets, will be at 50 pct by year's end. Another is placing 15-20 pct of output in steel cabinets, says the figure will grow but he doesn't know by exactly how much.

Steel used is most commonly mill-purchased 1010 cold-rolled sheet, though one manufacturer has done a heavy business in mill seconds, cold-rolled sheet of unidentified analysis. For one producer this amounts to 5000 tons of cold-rolled sheet in 1954. This is not a high figure, but one that he guarantees will grow and is double last year's tonnage. The completed sets range in price from $130 up to $200, tube sizes range through 17 in., 21 in., and even 24 in. Colors vary but there is a strong movement to stop making steel look like Lower Cambodian Teak or the like, let the steel look like

just what it is, painted or lithographed steel.

One producer has figured he can build a small cabinet for a 17 in. TV tube and chassis for $1.56, which is the all time low. He does it by painting the sets on one line. If one of these gets scratched, he moves it onto a second line where the set is covered with a leathery plastic. No scrap loss, and $1.56 end cost per cabinet.

Heat, once suspected source of trouble for the steel cabinet doesn't seem to bother the ultimate consumer. Undercoating, metal baffle have been used to offset it. One manufacturer uses the greater heat radiation of the steel set as an actual selling virtue. Less retained heat keeps the electronic vitals healthy longer. Masonite, another cost cutting material, is another big favorite. Magnavox, for instance, has such a cabinet. Steel is generally felt to be lower in tooling costs, however.

One producer upped his number of suppliers of steel cabinets from one to three, partly to achieve a better freight situation, mostly because he will use more steel cabinets than ever before. A supplier of metal forming equipment who outfitted one Chicago TV producer with equipment for steel cabinet manufacture, now has orders from seven other TV firms. With anywhere from 25-40 lb of sheet steel in the cabinet (steel cases look good for table top models, not for larger units), it's literally a brand new market for sheet, and one that's growing.

Retail TV Sales
(No. of Sets)

1948	975,000
1949	3,000,000
1950	7,463,800
1951	5,348,798
1952	6,096,279
1953	
First Half	2,775,900
Year	7,000,000
1954	
First Half	2,805,760

CONSTRUCTION

WIRE: More Mesh For Roads

Welded fabric makes roads last 70 pct longer, costs little more . . . Expensive machines, handling cuts steel mill's profits . . . Was World War II baby—By T. M. Rohan.

◆ WELDED WIRE FABRIC has long proved its worth in highway and building construction. But use has been sparing. Today salesmen are eagerly eyeing new markets which could increase consumption by up to six times.

American Steel & Wire Div. of U. S. Steel at Cleveland last week showed one use for the product—a new 150,000 sq ft parking lot adjacent to its rod mill got "the treatment." This is believed to be the first time wire fabric has been used in reinforcing an entire original surface of asphaltic concrete over a slag base. The week before wire fabric was laid down on resurfacing Cleveland's busy Public Square—first time used in Ohio.

Initial Cost Higher

Thriving mostly on this type of roadbuilding and construction including concrete pipe manufacture, the steel industry this year will turn out about 75,000 tons of welded wire fabric. Output during present peak is about 70 pct of capacity.

But M. E. Capauch, American Steel & Wire Div.'s construction sales manager, estimated last week if all new public concrete and asphalt roads as well as private driveways had wire mesh, it would represent an additional 500,000 tons annual market.

Major drawbacks are additional original investments in a highly competive, cost-conscious roadbuilding industry and antiquated building codes. Although test sections of roads dating back to 1946 near Port Arthur, Tex., have proved cracking was reduced 55 pct in 1 year and 70 pct in 6 years, today only about 68 pct of new concrete road mileage nationally has reinforcing fabric. Use is even less with asphalt. Yet original added cost is roughly about 6 pct which is more than compensated for in reduced maintenance. In Texas the 1946 test section is still in good shape, while adjacent unreinforced sections have been replaced.

Spreads The Load

In private driveway construction, major deterrent is hot price competition between contractors. On a typical $500 job, added cost will be about $30. Householders generally settle for a traditional "solid concrete drive" at $30 less even though it is oftentimes inadequate for long service. Building codes either do not cover this construction or at best were designed to cover lighter weight 1920-era autos.

Use of welded wire spreads the load over a greater area and binds pavement together through anchoring action of welded cross strands. This offsets paving's major weakness, lack of tensile strength—but does not affect its compression features. On bus stops, principal advantage is prevention of "washboarding" due to braking by heavy buses.

Major impetus to use of wire fabric in road construction came in the Pacific in World War II. Construction men had little time to prepare road foundations so used the fabric over soft spots to help take pounding from trucks, tanks and materiel. During the war years over 60,000 tons were used in the Pacific theatre in this way. Since the war, jobs have been sporadic—about one major resurfacing job per year.

In 1953, however, this jumped to six and indications are this year it will go considerably higher. Tendency of building 100-ft sections between expansion joints to cut maintenance rather than traditional 50-ft centers is also expected to increase usage.

For the steel industry, welded

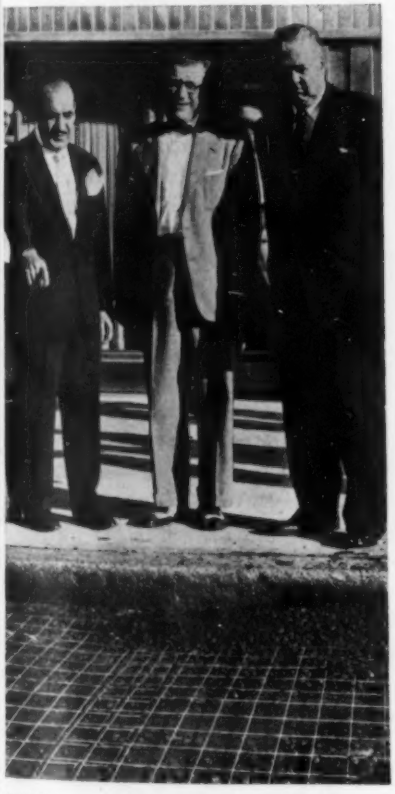
wire fabric is not overly profitable because of heavy competition, high cost of investment, 10,000 different varieties, storage and transportation difficulties due to bulkiness and high changeover time on producing machines.

Major producers are Colorado Fuel & Iron Corp. at Pueblo and Buffalo; Armco at Kansas City and Houston; Keystone at Peoria, Ill.; Republic at Birmingham; American Steel & Wire at Joliet, Ill., and Donora, Pa.; Detroit Steel at Portsmouth, O.; Northwestern Steel & Wire at Sterling, Ill., and Laclede Steel at Alton, Ill.

Summer Sales Peak

Fabric making machines cost from $300,000 to $450,000; and 75 pct of total shipments must be made during heavy 6-month summer construction season. Changeover time between styles is up to 4 or 5 hours and seldom less than a half hour.

Major agencies exploring new markets for the material besides regular steel sales offices are the industry-sponsored Wire Reinforcement Institute Inc. in Washington and a research committee of American Iron and Steel Institute.



FIRST installation of welded wire fabric with asphalt for roads in Ohio is pointed out by Cleveland Mayor A. J. Celebrezze.

MARKETING

STAINLESS: Slight Firming

Producers note slight quickening of orders but won't label it trend . . . Improvement spread over broad range of consumer industries, with flat rolled making brightest showing of all—By J. B. Delaney.

◆ STAINLESS STEEL producers report a slight quickening of the order pulse beat in recent weeks. But they refuse to label it a trend.

Until their two principal customers—automotive and appliances—start placing orders, the producers feel it's not smart to make optimistic predictions. Foundation for the present improvement is so thin, they're afraid the market might turn sour again.

Nevertheless, a tentative feeling of encouragement is apparent.

Await Auto Orders

One producer believes that a slight improvement in orders for stainless strip might be an indication that automotive suppliers are about to re-enter the market in anticipation of requirements for new model cars.

Volume of strip buying for automotive trim purposes has not yet reached proportions that suppliers would expect if the car makers had given the green light to their trim and molding fabricators. But it could be a straw in the wind. Some sources are speculating that Detroit may be buying just enough to set off their new models for dealer show room purposes with the intention of pulling out the stops when they learn whether the public is in a buying mood.

Stainless mills are fighting a hard battle to convince automakers that stainless trim is less expensive than plated. They are having some success, but meanwhile some sources believe that the switch to plated trim with the easing of nickel supplies has hurt Detroit stainless producers more than any other factor.

Another mill source feels that an upturn in automotive and appliance outlook will be reflected almost immediately in improved demand for stainless sheet and strip. He notes that his flat-rolled order book today is in line with the operating pace of auto and appliance makers.

Stainless sales executives agree that the modest upturn in demand is spread over a broad range of consumer industries, with flat rolled volume making a better showing than other products. Bars, for example, give no sign of improvement although demand appears to have leveled off. The wire market continues poor. Plate and heavy gage sheet have perked up.

The general steel decline has been more acute in stainless than in most other steel products. Stainless shipments in the first 6 months of this year amounted to 219,572 tons, compared with 336,314 at the same time in 1953—a decline of over 34 pct.

In relation to previous years, this year's showing is not so bad. In the comparable period of 1952, stainless shipments were 237,397 tons; in 1951, 275,015 tons; and in 1950, 209,206 tons.

Who Bought It

In the first quarter of 1954, the automotive industry bought 23,995 tons of stainless compared with 31,192 tons in the same period of 1953. Appliance makers took in 7726 tons in first quarter of 1954 compared with 10,687 tons in the like period of 1953.

The depressed state of the market, plus competition with aluminum in flat rolled, has forced stainless producers to absorb the whopping wage and fringe benefit package won by the United Steelworkers in their latest contract.

Stainless prices are not likely to move unless demand improves considerably. At the time other steel prices were advanced following the wage settlement, U. S. Steel Corp. announced its stainless prices would hold pending further study.

EXPANSION

PLANES: Built by Toolmaker

Kearney & Trecker form Milwaukee subsidiary . . . Firm will assemble and market 180-mph executive plane from U. S. and Italian parts . . . Will sell for $70,000.

◆ KEARNEY & TRECKER, machine tool builder with a reputation for the unexpected, caught the industry in mid-stride early last week with the announcement that a subsidiary had been formed to handle assembly and distribution of a gull-wing, twin engine (two 260-hp Lycoming engines) amphibian plane.

The subsidiary, Royal Aircraft Corp., will assemble and distribute the "Royal Gull" at new facilities in Milwaukee, has announced a $65,000 to $70,000 price on the ship, will market it throughout North and Central America.

Bringing the aviation industry home to Milwaukee (intrepid Wisconsin aerial pioneers were building aircraft about the time the Wright Brothers went aloft), Royal Aircraft will assemble an Italian-built airframe and wings, the Lycoming engines, and instruments, propellers, radios, wheels, and tires purchased in the U. S.

Start Production Soon

Initial construction of the pusher type, 180-mph executive plane will begin within the next 5 weeks, with the first showing scheduled for the National Aircraft Show beginning at Dayton, Sept. 4. Kearney & Trecker President Francis J. Trecker began an association with the Italian firm producing the wings and monocoque fuselage, Piaggio & C., during a 1953 European trip.

Sensing potential sales in mining and timber survey work, petroleum search, commercial fishing, and company air travel, he instituted a series of surveys that indicated the market existed, was well worth the move. Mr. Trecker, who had previously worked with Pratt & Whitney as a student engineer, is a pilot himself.

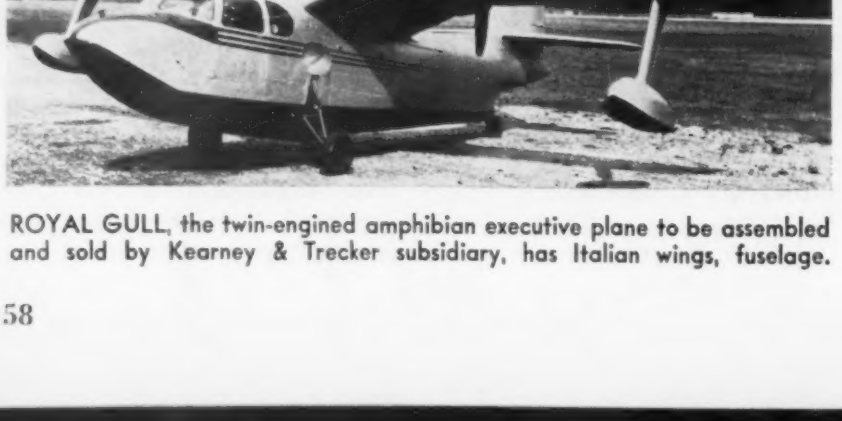
With its introduction of the Royal Gull, it's worth noting that Kearney & Trecker has chosen a plane that is exclusive in its class. The Royal Gull will be the only twin-engine amphibian produced in the U. S., Grumman having gone out of the market.

See Replacement Market

With about 250 such planes still in operation, and with the Royal Gull performance figures suggesting that it can outclass the older planes, replacement alone would suggest an easy starting market.

Royal Aircraft will reportedly shoot for $1.5-$2.5 million annually and with $35 million in planes sold for private commercial use last year, is fairly confident that it will hit this goal within the first year of operation.

As a cost reduction measure, selling will be direct. Direct mail and direct sales contact will be employed rather than a distributorship system.



ROYAL GULL, the twin-engined amphibian executive plane to be assembled and sold by Kearney & Trecker subsidiary, has Italian wings, fuselage.

Shipbuilding:

Government steps up action to relieve industry.

Government action to help relieve the badly crippled U. S. shipbuilding industry has moved into high gear. During the week there were a number of announcements from government agencies concerning invitations to bid on various shipbuilding and repair programs.

In one development private ship owners were asked to make offers for the 10-year charter of from 1 to 15 tanker vessels still to be built. Invitations stem from the Military Sea Transportation Service.

The agency has prepared a letter giving details on characteristics of the new tankers, requirements of offer and charter terms, other data needed with the offer, and the basis for evaluation.

MSTS says charters will be awarded in accordance with a recently-passed law stating that preference will be given to those who are operating American flag ships, exclusively.

Modernize Mothball Fleet

Because of the new charter plan, it is expected that most of the Navy-owned tankers now run by MSTS will be replaced by the more modern tankers and sent to the National Defense Reserve Fleet.

Petroleum products for military use then will be carried primarily in the larger and faster tankers.

Meanwhile, it was revealed that 55 pct of the $12 million appropriation for modernizing 50 merchant ships of the mothball fleet will go to Atlantic Coast shipyards.

Sen. Thomas H. Kuchel, R., Calif., says he has been told by E. C. Upton, Jr., Acting Maritime Administrator, that the split will be made on a monetary basis, re-

gardless of the actual number of vessels repaired in Atlantic yards. Pacific Coast shipbuilders, Kuchel says, will get 29 pct of the appropriation, and Gulf Coast yards the remaining 16 pct.

Bids for the work, authorized recently by Congress, will probably be invited early in September, Mr. Upton says.

More Tanker Bids

American shipyards are also being asked to bid on construction of four fast tankers for which Congress appropriated $30 million.

These vessels are to be built for the Military Sea Transportation Service. Issuing the bid invitations and acting as construction agent for the tankers is Maritime Administration.

Vessels are to be built to these specifications: Overall length, 640 ft; beam, 84 ft; draft, 32 ft; deadweight tons, 25,000; cargo capacity, 231,825 bbl; normal sea speed, 18 knots.

Nickel:

Sherritt Gordon now producing at new plant.

Canada has brought in another nickel producer from the mining of the ore to the refined nickel. Eldon L. Brown, president of Sherritt Gordon Mines Ltd., stated that the first nickel metal was discharged from the autoclaves in the Fort Saskatchewan plant on July 22nd. Ammonium sulphate production started during the last week of July. The plant now is in regular production with metallic nickel and ammonium sulphate being shipped to consumers.

Mr. Brown says the start up of the plant followed the pattern established in the Ottawa pilot plant. No troubles were encountered with the process which has been working exactly as the pilot plant operation indicated it should. Nickel produced has been up to specification since the start.

The mine at Lynn Lake is currently producing nickel concentrate at a rate considerably in excess of estimates, although the tonnage milled is less than 2000 tons per day.

The new Sherritt Gordon refinery, however, has not sufficient capacity to treat all the concentrates from the company's Lynn Lake mine. Mr. Brown stated that the company would not be able to handle the present stockpile of concentrates for several years. Mine is producing at a greater rate than anticipated and enough concentrates are being shipped to keep the refinery busy without dipping into the stockpile.

It is also reported that International Nickel Co. of Canada and the U. S. General Services Administration are negotiating an arrangement whereby INCO would treat Sherritt Gordon's $5 million stockpile of nickel concentrates. U. S. government has advanced funds to Sherritt Gordon equal to 80 pct of the contained nickel in the Sherritt stockpile and, in effect, now owns the concentrate. Apparently the U. S. wants the nickel without further delay and is trying to induce INCO to treat the concentrate.

Granted Fast Writeoff

Tax amortization certificates permitting 5-year write-offs are granted to Youngstown Sheet and Tube Co., United States Steel Corp., and 54 other firms for new plant and equipment to bolster the nation's

EXPANSION

industrial capacity by the Office of Defense Mobilization.

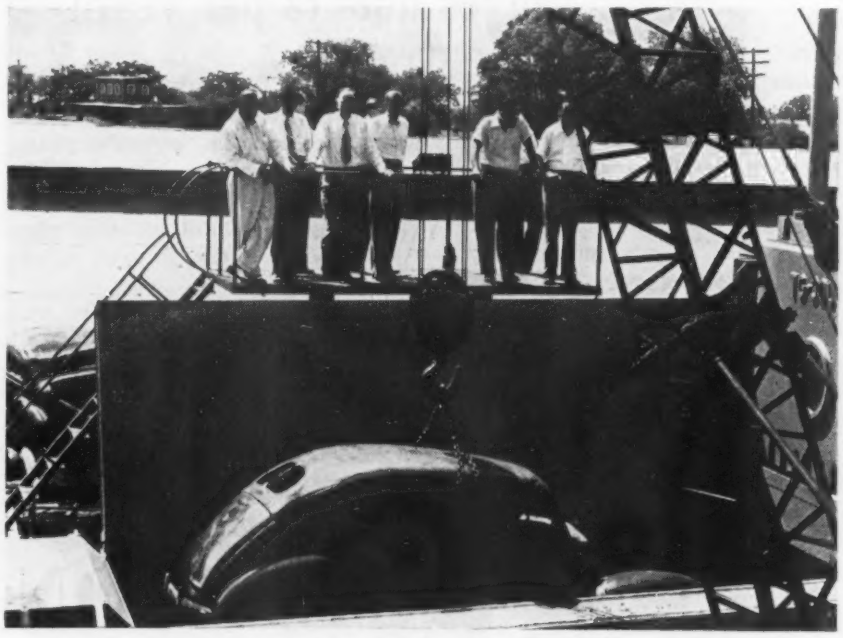
Youngstown will be permitted to write off 50 pct of the $8.1 million cost of about 76 new coke ovens at its Youngstown, O., plant. U. S. Steel will write off 50 pct of $6.1 million cost of new facilities for research and development. Eighty-five pct write-off is allowed the Southern Pacific Co. for 1500 freight cars costing $11.5 million.

Titanium:

Rem-Cru plans $12.8 million ingot, finishing expansion.

Rem-Cru Titanium, Inc., with headquarters at Midland, Pa., will spend nearly $12.8 million for expansion of titanium ingot and finishing facilities, probably within the next 2 years.

While definite construction plans have not been formulated, a certificate of necessity covering the expansion program has been authorized by the Office of Defense Mobilization. Rem-Cru, owned jointly by Crucible Steel Co., and Remington



MAMMOTH scrap baler made by Harris Foundry & Machine Co. is large enough to hold two average size cars at one time. The scrap bailer can smash an entire car or truck into a neat lump in only 2 minutes.

This flick of the wrist saves dollars per year!

Even in the elementary job of watering industrial truck batteries, EDISON batteries have been designed to save you money. As part of its steel construction, each cell is equipped with a hinged filler cap which opens easily and cannot be mislaid. Minutes per day are saved by this EDISON feature alone.

This is only one reason for EDISON battery's lowest over-all cost. Because of their resistance to electrical abuse and their steel cell construction, EDISON batteries give more than *twice the performance life* of other type batteries in industrial-truck operation. They are not harmed by the overcharging, or short-circuiting incidental to this service. Ease of daily handling and charging of EDISON batteries also keep industrial truck costs down to minimum.

Examine the EDISON cell's profitable advantages at your own desk. Send for bulletins 2039 and 3808; ask for the EDISON field engineer's call. Write Edison Storage Battery Division, Thomas A. Edison, Inc., West Orange, New Jersey.

Most dependable power... lowest over-all cost you get both with an EDISON

EDISON

Nickel • Iron • Alkaline

STORAGE BATTERIES

EDISON ALSO MAKES THE FAMOUS "V.P." VOICEWRITER AND THE TELEVOICE SYSTEM

Arms Co., will be permitted accelerated amortization on 75 pct of the cost.

The proposed expansion is in line with the government's goal of 37,500 tons of titanium capacity a little over 2 years hence. Titanium sponge production last year was approximately 2300 tons. The U. S. Air Force estimates sponge capacity will be built up to 9800 tons this year. Estimated requirements for an all-out war are 100,000 tons of metal per year.

Rem-Cru's present ingot capacity at Midland is 2500 tons. When the proposed expansion is completed, its ingot and finishing capacity will be between 11,000 and 12,000 tons.

The Air Force is titanium's biggest customer, although there are scattered civilian applications despite the metals high cost (slightly less than $5 per lb. in sponge form).

Presses for Alcoa

Two large forging presses will be installed by Aluminum Co. of America at its Vernon, Calif., works as part of a $4 million expansion program.

The presses, of 8000 ton and 1500 ton capacities, are expected to be in production next year. They will be housed in new and acquired buildings comprising 72,000 sq ft of additional floor space.

The new facilities will be particularly suited to production of precision type aircraft forgings involving little or no draft angle, according to ALCOA.

Schloemann, A. G., of Dusseldorf, Germany, will build the 8000 ton press, scheduled to be in production by Fall of 1955. Unique in its size, the press will have three hydraulic cylinders which will permit operation at three different capacities—2700, 5400, or 8000 tons. The 1500 ton press will handle larger and more varied hand forgings and will enlarge the scope of impact and precision forgings. It will be in production early next year.

The smaller press will be moved from its present location, where it is on standby basis, to Vernon under lease from the U. S. Air Force.

THEFTS: How You Can Prevent Them

Petty thievery in industrial plants costs millions of dollars each year . . . Management can cut down losses by setting up good control system, proper indoctrination . . . Discharge for theft a must.

♦ PETTY THEFT of tools and equipment in industrial plants doesn't amount to a national crime wave but it is costing companies millions of dollars each year. With the current emphasis on cutting expenses wherever possible, the problem of how to reduce petty theft losses is coming in for more attention by management than ever before.

Most employers regard petty stealing as a minor consideration until some valuable piece of equipment is taken. Then from investigation they learn that the practice of walking off with parts and tools is fairly common in their plant and that the cost of such losses is greater than they realized.

Thefts in Every Plant

In some cases in-plant thefts are outright criminal acts with the employee hoping to gain from resale of the stolen goods. More often, however, it's a case of "borrowing" something to do some work at home. Whatever the cause, the only way to cut down on this practice is through a well organized control program.

Interviews with plant security and personnel directors show that there is some petty thievery in practically every plant. Most common items stolen are tools. And it seems that there is a greater incidence of theft in departments hiring a lot of new workers. This is particularly true in plants that require workers to use their own tools. Reason is a new employee may not have a full set of tools and is tempted to fill in the gaps.

It has also been found that employees who take tools or parts for use at home seldom return them voluntarily. If the employee is aware that a tool has been reported missing, however, it is frequently "found" a few days later.

Starting point in a program to reduce petty thievery is proper indoctrination of new employees. They should be told that anyone caught stealing will be discharged immediately. And this practice should be rigidly enforced.

Many plants inadvertently condone some thefts through their practice of graduated penalties for stealing. First there may be a warning, then a layoff and finally discharge.

This system encourages some employees to take a chance, knowing that the first penalty won't be too severe. Standard procedure should be immediate discharge.

Report Thefts Quickly

One of the most important safeguards against petty thievery is making certain the theft is reported immediately. At Republic Aviation Corp. employees are urged to report any missing tools "within the hour." This reduces the likelihood the missing item will be taken out of the plant and once it is known that the theft is being investigated there is a good chance it will suddenly turn up somewhere.

For small companies it is often a help to stamp or paint company tools. This is also a good idea for employees who own their own tools.

"Filters! Nothing but filters!"

Publicize Thefts

Experience has shown that it is not good practice to inspect workers at the end of a shift as this has a bad effect on morale. But management can: (1) Rotate guards at exit points to prevent them from becoming too relaxed and making too many friends; (2) install turnstiles at exits. This slows up the workers on their way out, makes it easier for guards to see what each worker is carrying or wearing.

Publicity in house organs, through employee meetings or bulletin board posters also helps reduce petty theft. Some employers fear that publicizing thefts may actually increase their frequency, but this is not the case. Most employees know some thievery is going on and if you try to hide the problem by not mentioning it, some workers may get the idea management either accepts this practice or isn't very concerned about it.

Pool Facilities

A new twist in the current merger trend is the pooling of facilities of two firms which will retain their separate corporate identities. The two are Salem-Brosius, Inc., and Phillips Corp., the former an industrial furnace and metalworking equipment producer, the latter a manufacturer of mine equipment and supplies.

Under the arrangement, Salem-Brosius will lease space in the Phillips plant and purchase some equipment from Phillips. In return Salem-Brosius will use these and some of its older facilities in production for both firms. Phillips production will be done on a contract basis.

DEFENSE

TOOLS: Plug Stockpile Gaps

ODM tells federal buyers to speed procurement of machine tools . . . But must stay within current funds limits . . . To round out defense tooling programs—*By R. M. Stroupe.*

◆ THE GOVERNMENT'S "gentle nudge" program (to help the economy gain momentum in the upswing) is going to be felt in a lot of places.

It has already had a stimulating effect on materials being bought for the strategic stockpile, on public works and highway construction, and on ship and tanker construction. These were the main beneficiaries of a $1.6 billion supplemental money bill recently voted by Congress at the request of the White House (THE IRON AGE, Aug. 26, p. 64).

Spend It Now

Now the nudge program is to be felt in still another way.

Federal purchasing agents are being told to use funds they now have available to buy tools and related equipment needed to fill gaps in the defense program.

Like industrial purchasing agents, government buyers frequently are slow to place orders for equipment—even though purchase has been authorized and money appropriated.

Renewed efforts are now being made to fill the gaps in stocks of government-owned machine tools and related equipment used in defense production.

Stay Within Limits

Orders for this action are going out from Office of Defense Mobilization to federal procurement agencies as part of a directive aimed at insuring the adequacy of facilities for producing military end-items.

While urging the buying agencies to give priority to the need for long-lead-time tools, ODM recognizes that there is a dollar ceiling on the purchasers' moves. For example, Defense Dept. now has a $100 million lid on its acquisition of new machine tools.

Consequently, the ODM directive says missing equipment will be bought "within the limit of currently available funds."

Keep Plants Up

The same order stresses the importance of maintaining in good condition those government-owned production facilities closed down and placed in a standby status. To oversee this operation, ODM is creating a Defense Facilities Maintenance Board, with members from Defense Dept., the Armed Forces, Commerce Dept., and Atomic Energy Commission.

This board has the job of recommending to the Defense Mobilizer any necessary methods beyond the authority of the interested agencies for making certain that plants owned by both the government and private business are kept in shape to produce when required.

"I know it's silly. But it was in the suggestion box today."

Defense Dept. is given responsibility for choosing its mobilization base from those plants producing military items of prime importance. Maintenance will be weighed toward output of the 1000 major items on the department's preferential planning list.

AEC and Maritime Administration are directed to work with ODM in choosing those facilities that will be within their range of maintenance.

As guidance in selecting facilities to be mainatined, ODM lists five standards, one or more of which must be met by the items produced. Items included are those:

(1) Requiring a long lead-time or long manufacturing cycle;

(2) Not now in production, or those required in amounts far exceeding peacetime output;

(3) Necessitating conversion of an industry, or of a number of plants within the industry;

(4) Needing materials or manufacturing methods basically different from those now used;

(5) For which industry has no production experience.

Repower Mothball Ships

Maritime Administration, as part of its program to modernize ships in the national defense reserve fleet, intends to make an award in about 5 weeks for installation of a steam turbine power plant in a Liberty Ship.

In keeping with this program, the agency named General Electric Co. to equip another of the 1500 mothballed Liberties with a gas turbine.

The GE unit is expected to be the largest gas turbine operating in any merchant ship. Proposed by the company is a 6000-shaft hp gas turbine—a modified version of a unit now used in industry.

Plans call for the gas turbine to be operated in connection with a controllable-pitch propeller, the largest of its type ever to be used by this country.

Maritime Administration anticipates that the new power plant, designed to operate on low-grade fuel oil, will lower vessel operating and maintenance costs appreciably.

SPAIN: U. S. Cold War Secret Weapon

Indication is U. S. plans to use Spain as combined arsenal-supply base if war comes in Europe . . . Direct Red attack, civil-upheaval unlikely . . . Would supply arms to U. S.

♦ IN THE BEST of all possible worlds Spain would probably not have been tapped to be one of America's postwar allies. But in fighting the Reds, the U. S. has been forced to turn back the sheet for some rather odd bedfellows—Franco being one of them.

Now it appears the U. S. is about to receive the payoff on its reluctant game of footsie with Franco Spain. Evidence is mounting that one phase of U. S. defense policy is to use Spain as an overseas arsenal and supply base in event of war in Europe.

Logic in picking Spain as a combined arsenal-supply base is this:

(1) Unlike France or Germany it is extremely unlikely that the Reds will threaten Spain militarily;

(2) It also seems improbable that there will be any internal upheavals inside Spain for some time.

(3) By using Spain as supply source for its armed forces in time of war the problems and hazards of shipping military goods from the U. S. to Europe would be greatly reduced. Also we would benefit from use of Spanish airfields.

Didn't Say No To Franco

It seems probable that this is one reason the U. S. remained out of the dispute between Britain and Spain over arms shipments to Egypt.

Recently Spain started sending the first part of a $2.8 million arms shipment to Egypt and, contrary to some reports has accepted orders for another $3.1 million worth of military goods for Egypt. At the time Britain protested the sales, fearing Egypt might use these arms against British troops in the troubled Suez Canal area.

But since the U. S. is interested in keeping Spain's arms production capacity at a maximum there was no attempt to dissuade Franco from selling arms to Egypt, even though this policy may have interfered with British interests.

Decide Without Delay

At present Spain is receiving aircraft, tanks, and heavy armament from the U. S. but is producing light armament and field artillery up to 150 mm on its own. It is in the lighter arms and ammunition categories that the U. S. hopes Spain will be able to provide the biggest lift.

Spain has had access to arms improvements developed by the Germans, Austrians and Czechs during World War II and due to its one-man-rule government has been able to make quick decisions on arms standardization questions.

There have been no delays such as NATO forces encountered in trying to decide what rifle should be made standard equipment. Though NATO finally decided this spring to accept the Belgian rifle, production is still in the blueprint stage.

Spain, however, with the aid of U. S. machinery, has been able to develop its infantry ammunition, weapons and light artillery so rapidly that the job of replacing obsolete arms has just about been completed.

What We're Ordering

Some of the Spanish armament such as its 30-mm AA gun and its new 105-mm field gun have been called by some U. S. military experts "among the best existing."

There is an obvious difference in the way Spain and the NATO na-

FRENCH STRUCTURAL STEEL industry representatives watch flame cutting operation at the Joseph T. Ryerson & Son, Inc. steel service plant during their 6-day stay in Chicago. From left, front, Charles Beau, group leader, Jean Traverse, Roger Geny, Robert Carriere, Andre Tangre, Albert Chassagne, and Georges Douin. In rear, R. E. Campbell of Ryerson, Mrs. Michael Saulnier of the French Embassy, and A. R. Gorman of Ryerson.

NORTHERN SUPER CRANES • UP TO 150 TONS

Northern Super Cranes—since 1899—have been moving endless tonnages of material in thousands of plants in the United States and other countries. For safety, durability, precise manipulation, unsurpassed electrical equipment, minimum maintenance and maximum dependability in heavy duty service, many plant managers have installed Northern Cranes exclusively.

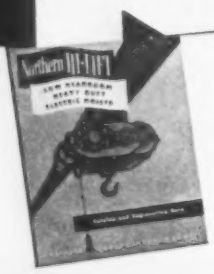
Write for Bulletins SE-108-A and G-700

NORTHERN HI-LIFT CRANES • UP TO 20 TONS

Northern Hi-Lift Cranes are intended both to supplement Northern Super Cranes in heavy duty service and to provide economical work handling in lighter service. They have the same engineering features as Northern Super Cranes—low design stress for safety—high grade steels, turned and ground shafts and press fits for durability—highest quality electrical equipment and controls for dependable operation.

Write for Bulletin HL-115-R

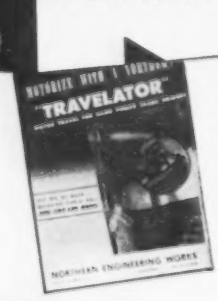
NORTHERN HI-LIFT CRANES • 2 TO 15 TONS



Northern Hi-Lift Hoists are heavy duty type electric hoists, designed especially for low headroom installations. They feature heavy duty roller bearings, extra heavy bearing shafts accurately press fitted with bearing races, extra large independent mechanical and electric brakes, and many other elements required in a good investment in hoist equipment.

Write for Bulletin H-112

NORTHERN TRAVELATORS • FOR LIGHT CRANES



The Northern Travelator is a bridge drive unit which can be applied to a hand traveled crane to convert it to power travel. It can be easily installed by your own mechanics and electricians in a few hours time. The roller chain drive facilitates installation and provides longer life and greater ability to absorb the usual impacts of crane service.

Write for Bulletin T-105

NORTHERN CRANES—HOISTS—TRAVELATORS

NORTHERN ENGINEERING WORKS
210 CHENE ST., DETROIT 7, MICH.

tions fit into U. S. defense strategy. The U. S. has placed offshore orders with many European nations to build up NATO strength. Most of these orders were for ammunition, with the NATO forces being required to supply own arms.

U. S. orders placed in Spain, however, have been for direct use by American forces in Europe and North Africa. First orders were for anti-tank mines followed by orders for 75, 105 and 155 mm artillery shells. Latest request was for mortar shells.

It is estimated that between October of this year and October 1955 the U. S. will place substantial orders for ammunition, anti-aircraft and field guns, spare parts and other equipment.

As part of the buildup in Spain, the U. S. is helping to finance Spanish aircraft production. Professor Heinkel, the well-known German aircraft designer who was responsible for development of the Heinkel fighters and bombers during World War II has been in Spain for some time and is now acting as an aircraft advisor.

U. S. plans for Spain may also include a program involving stockpiling of strategic materials. Probable stockpile items would be tungsten, tin, copper, zinc, lead, mercury and manganese which are in fairly abundant supply in Spain. The U. S. may also round out the stockpiling program by shipping chrome, asbestos, mica and magnesium for storage in Spain.

"We're nearing civilization. He's been run over."

EXPORTS: Ease East Europe Embargo

Commerce Dept., FOA ease bans on shipment of industrial goods to Russia, satellites . . . Drop export licenses to allies . . . Security list trimmed, not abandoned . . . Doubt export surge—*By N. R. Regeimbal.*

♦ YOU ARE NOW FREE to sell to Soviet Russia and her European satellites a long list of industrial supplies and equipment that have been lifted out of strict embargo.

Easing of trade restrictions also permits you to sell these items to friendly nations without export licenses which had previously been required. However, you still need a license to sell the goods to countries behind the Iron Curtain.

Relaxed trade controls do not apply to Red China or North Korea.

Eased, Not Lifted

Easing of trade restrictions came on Aug. 25 when Dept. of Commerce cut its "positive list" of 1450 items to 787 categories. Its "security list" of strategic goods, formerly containing some 300 items, was also trimmed to 217 categories.

Some 30 items, including some types of steam engines, coal-tar products, industrial machinery and chemicals will be added to the positive list on Sept. 7.

Items removed from the positive list may now be shipped to friendly countries without a license, and to Communist countries provided a license is obtained.

Items which remain on the security list may not, under any circumstances, be shipped or transhipped to the Soviet bloc.

See Small Effect

Simultaneously, Foreign Operations Administration cut its "Battle Act" list, corresponding to the Commerce Dept. security list, by which this country prohibits countries receiving our aid from shipping to Communist countries.

No munitions or atomic energy items were removed from either list, although many other categories were redefined to remove some less important sizes and types of strategic goods to permit their export.

Exports of many types of heavy and light machinery, passenger cars, trucks, tires, farm equipment, household appliances and food—items underproduced by the Reds—will be permitted to be exported under the new rules. Scrap iron and steel, brass and bronze fabrications for munitions, titanium, molybdenum, germanium, columbium and cobalt remain on the list.

Easing of the embargo is not expected to unleash a big spurt of trading with the Reds. Commerce officials cite the Soviet bloc's aim of self-sufficiency, as well as its inability in the past to provide desired goods in exchange for imports.

Reds Have Some

Also, many of the items on which trade restrictions have been eased are in adequate supply behind the Iron Curtain. This was ascertained during exhaustive reviews of international product lists by 15 friendly nations meeting in Paris. In revising its lists, the U. S. Government has had the benefit of all the intelligence, technical, trade, and other information that the participating countries were able to muster.

For example, in the metalworking machinery group certain types of boring and turning mills were embargoed, while control of smaller sizes is eased. Also, certain types of lathes are still embargoed; while others, incorporating no advanced technology and produced in quantity in the Soviet bloc, have been deleted from the list.

If the Communist countries meet their exchange commitments, the easing of trade restrictions might eventually lead to substantial trade which in time could become of real economic importance to the U. S.

But officials are doubtful that the so-called Red trade offensive is anything other than a propaganda device. They do not expect the Communists to pick up the offer to any great extent.

Friendly countries which ship goods on FOA's embargo list to Red countries will automatically stop receiving U. S. aid. In addition, FOA maintains another list of "quantitative control" items—now cut from 90 to 20 categories—which it permits to be shipped but requires exports to be reported in order to keep a lookout for sudden shifts in buying by the Reds.

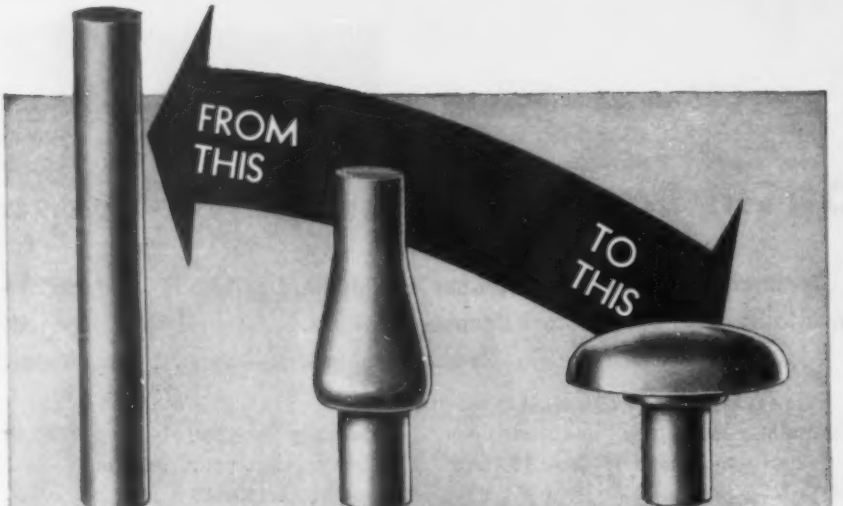
What It Covers

Following is a selected list of industrial categories on which export restrictions have been eased. These items may now be sold to Russia and European satellites provided an export license is obtained. They may now be sold to friendly nations without license.

Full text of the new regulations is available from the Commerce Dept., Bureau of Foreign Commerce, Washington 25, D. C.

STEEL INGOTS, blooms, billets, slabs, sheet, bars, and some tin-plate products; rails, over 60 pounds per yard; rail accessories; pipe, tubes, except scrap; carbon steel wire, coated, uncoated, or galvanized; railway wheels and axles; drills, bits and jacks; die blanks; basic hardware, including bolts, screws and rivets; pipe-fittings, including copper base alloy, copper, lead, zinc, or aluminum; fabricated steel products, including storage tanks, prefabricated buildings, bridges, shipping containers; welding rods and wires.

FERRO-ALLOYS of manganese, vanadium, silicon, titanium or tungsten; aluminum ores and concentrates; semi-fabricated copper forms and copper base alloys; lead ores and scrap sheets, pigs, bars, and pipe; tin ore and concentrates, ingots, bars, and other forms; zinc scrap, crude forms, and semi-fabricated forms; non-ferrous ores,



Forming the above Special Pan Head Bolt in two blows presented a difficult cold heading problem that was solved by the use of Keystone "Special Processed" Cold Heading Wire.

The superior grain flow characteristics of "Special Processed" Wire provided the necessary upsetting and die forming qualities to withstand the terrific displacement of metal during the two blow process. The head was formed without buckling, distortion or cracking — longer die life, increased production, and a higher quality finished product resulted.

Carefully selected ingredients — our own exclusive drawing and heat treating process — rigid quality controls and inspections — give this wire unsurpassed performance on any unusually difficult cold heading job. Your inquiry is welcomed.

Keystone Steel & Wire Company
Peoria 7, Illinois
Industrial Wire Specialists

concentrates, scrap and semi-fabricated forms including titanium, tungsten, manganese and chromium.

ELECTRICAL machinery and apparatus including steam turbine generators under 500 kw; welding sets; transformers and regulators; motor generators and converters under 150 kw; mechanical power rectifiers over 50 kw; electrical transmission and distribution gear including switchboards and panels; motors up to 200 hp, except propulsion motors for land transportation vehicles; electric (mining and industrial) locomotives; electric industrial furnaces; x-ray apparatus and parts; radio and television receiving sets and accessories; automotive electrical equipment; electrical wire.

STEAM ENGINES, turbines and parts; internal combustion engines, including diesel and semi-diesel for boats and tractors.

CONSTRUCTION, excavating and mining machinery, including power cranes and shovels, bituminous and concrete paving mixers, scrapers and accessories.

INDUSTRIAL trucks, tractors, railway cranes under 30 tons; electro-magnetic separators and hoists and drilling machinery.

MACHINE tools, including pipe or nipple threading machines; spindle tapping gear; drilling machines and shapers; automatic tinning units and electro-plating equipment, and foundry equipment and parts for casting semi-finished metals.

TEXTILE, sewing and shoe machinery; food and beverage processing machines; rubber tire and tube building machines; airconditioning and refrigerating equipment; industrial measuring recording or controlling instruments and gages; air or gas compressors; blowers; electric precipitators; mechanical vacuum pumps; molding machines for plastics; vacuum coating units for optical lenses and glass working lathes; chemical and pharmaceutical processing and manufacturing machines; ammonia oxidation equipment, and chemical dryers.

NON-ELECTRIC industrial furnaces, kilns and ovens; metal melting furnaces, and refractory brick and mortar.

TRACTORS, parts and accessories; agricultural machines, implements and parts; automobiles, trucks, buses and trailers, and parts, accessories and service equipment.

AIRCRAFT training equipment and test kit; parts and accessories for military watercraft; railway transportation equipment including steam, electric and diesel locomotives, railway cars, and parts for locomotives and cars.

CHEMICALS, including cokes and coal tar derivatives; scientific and professional instruments, appartus and supplies.

Seek Tax Break

Federal taxes on income derived from private investment abroad should be reduced considerably to stimulate financial interest in foreign undertakings, American businessmen have told U. S. Commerce Dept.

Many officials in 400 companies surveyed by Bureau of Foreign Commerce believe the government is not giving adequate support and protection to investors in overseas enterprises.

WAGES: Climb 80-100 Pct Since 1945

Survey of U. S. labor markets shows average earnings up 83 pct. for machinery industry . . . Unskilled wages rose 98 pct in 9-year period . . . Machinists pay up 75 pct . . . East, Midwest show most gain.

♦ CUMULATIVE effects of the successive rounds of wage hikes in the U. S. machinery industry since the final year of World War II have resulted in an average increase of 83 pct in hourly (straight-time) earnings of productive workers.

A survey recently published by Bureau of Labor Statistics covering 20 major U. S. labor markets over a 9-year period ending Jan. 1, 1954, revealed highest increase (98 pct) in the hourly earnings of laborers. Tool and die makers fared considerably less well percentagewise with a total wage increase of 71 pct since Jan. 1, 1945. Production machinists did slightly better than other skilled men with a 75 pct increase.

Unskilled Gain More

Greater percentage increase in hourly earnings of unskilled laborers was due to across-the-board cents-per-hour increases which were applied uniformly to skilled and unskilled alike. These wage adjustments had the effect of reducing the differential between the average pay of tool and die makers and laborers from 63 pct in 1945 down to 39 pct in January 1953. By January 1954 however, the trend had reversed and differential for tool and die makers had moved upward to 41 pct.

In actual dollars and cents the occupational pay spread between skilled and unskilled labor in 1953-54 remained about the same as they were in 1945. In the Philadelphia area for example, production machine tool operators earned an average of $2.20 per hour last winter as compared with $1.58 for materials handling laborers.

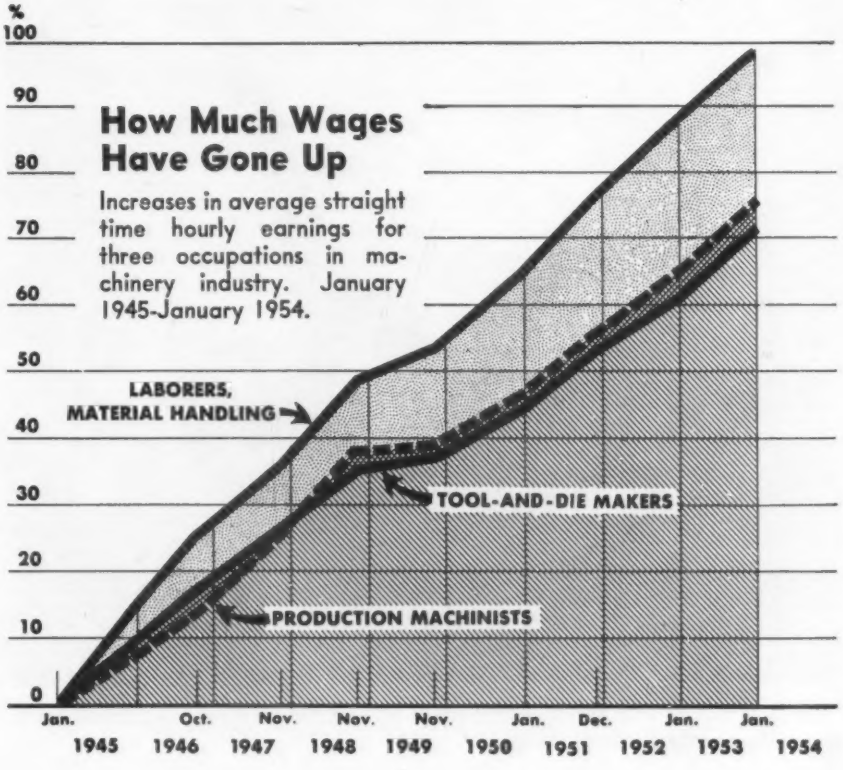
Wage adjustments for workers in the machinery industry varied considerably between the 18 areas for which comparable data are available. (Areas under survey by BLS were Baltimore, Boston, Chicago, Cleveland, Dallas, Denver, Detroit, Hartford, Houston, Los Angeles, Milwaukee, Minneapolis-St. Paul, Newark-Jersey City, New York, Philadelphia, St. Louis, San Francisco-Oakland.)

Average increases in hourly straight time earnings between January 1945 and January 1954 ranged from 67 pct in Dallas, Detroit and Los Angeles to 101 pct in St. Louis. Earnings almost doubled in Milwaukee (98 pct), rose by more than 90 pct in Pittsburgh, Denver and Philadelphia.

Largest percentage increase occurred in areas which had lowest earning levels after World War II. In an average of all areas over half of the wage increase recorded for the 9-year period occurred in the first 4 years immediately following World War II. Average annual rate of increase from January 1945 to November 1948 was 9.3 pct compared with 5.1 pct annual increase for the period November 1948 to January 1954.

However the actual cents-per-hour increases tended to be more uniformly paced over the entire 9 years. For example the 9.7 pct wage increase between October 1946 and November 1947 was equal to approximately 12¢ per hour, while the 7.5 pct increase between November 1949 and January 1951 equaled about 11¢ per hour.

In the areas surveyed, time-rate payment was the predominant method used in the machinery industry. In 10 areas 80 pct or more workers were paid on time basis.



RAW MATERIALS

Titanium:

ODM sets interim goal for processing facilities

Fast tax amortization certificates will be used by the Government in an effort to establish facilities to process 37,500 tons of titanium ingots a year by 1956.

Office of Defense Mobilization set the interim expansion goal to parallel an earlier goal of identical tonnage for titanium melting facilities.

Both programs are designed to meet estimated defense mobilization requirements of military and defense-supporting industry.

There are at present no processing facilities designed specifically for the production of titanium mill products. Titanium users have relied on stainless steel production facilities to make titanium rod, sheet, bar and other forms.

All titanium goals, including 25,000 tons of sponge production, are interim because a review of U. S. material requirements in event of mobilization is still under way. When this is completed, firm goals will be established, ODM says.

ODM expects that improved quality and reduced cost will result from production facilities especially designed for the metal. Present processes have made the cost of the metal excessive for many potential users. Production of titanium this year is not expected by ODM to exceed 5000 tons.

Develops New Material

Still unnamed, a new material developed by the Navy has a number of characteristics which will interest civilian industry.

It is the product of new methods of bonding fiber glass to produce laminates and tubular items of excellent strength. Now asking industry aid in making still further developments, the Navy says one indicated use for its material is in the manufacture of tubing for the oil and chemical industries.

These advantages are claimed for the Navy product:

(1) It has a high strength-weight ratio.

(2) It withstands higher temperatures than fiber glass materials now available.

(3) It has strong resistance to corrosive agents.

(4) Raw materials used in producing it are available in the U. S.

HIGHLY mobile 155 mm howitzer takes its first public bow. Ordnance rates this self-propelled gun at 40 mph.

Surplus Sale Tops High

A recent 3-day auction at the Paducah Atomic Energy Project set a new government record—highest percentage yield ever realized on a sale of this nature. A total of $1,515,713 was realized on the surplus materials which were advertised as worth $5.5 million.

Officials were gratified at the dollar return and especially pleased at the number of active bidders in attendance.

Navy Saves on Costs

Direct cash savings produced by the Navy's continuing materials conservation program totaled $25.8 million last year.

In addition, the Navy reports that it redistributed $125 million worth of supplies and equipment to other government agencies in 1953.

An important part of the economy operation is the brass recovery program, in which 13 million lb of expended shell casings were kept for reuse. This activity saved an estimated $2.6 million.

Cash scrap sales of ferrous and nonferrous metals, textiles, cordage, and miscellaneous items brought in $7.7 million.

Build New Minesweepers

Construction of a prototype minehunting vessel (AMCU-43) for the Navy will be performed by Consolidated Shipbuilding Corp., New York, at an estimated cost of $1.78 million.

Planned as part of the fiscal 1954 shipbuilding program, the AMCU will be employed principally to locate mines and other underwater obstacles, rather than to sweep them. Instead of the customary minesweeping gear, it will carry various types of electronics instruments to assist in detection.

Can Get AEC Patents

Atomic Energy Commission has listed 25 new government-owned patents for public licensing.

Applications for patent use should be addressed to the Patent Branch, U. S. Atomic Energy Commission, Washington 25, D. C.

Report To Management

"When the U. S. gets the sniffles, Europe comes down with pneumonia." This has been a pet cliche of economists for many years, but it's no longer true.

Late last year when Europe suddenly discovered there was a chill on U. S. economy, many foreign observers, particularly those in England, figured it meant Europe was headed for the deep freeze. It wasn't.

You know about West Germany's startling, sometimes disquieting, economic recovery. This has continued through 1954 despite the U. S. recession.

And less publicized, less dramatic, but perhaps even more significant has been the prosperity Britain is enjoying this year.

As the English publication, *The Economist*, stated recently with a combination of characteristic British reserve and uncharacteristic Americanese: "Most of the current indicators of demand and activity might suggest that in the short run the British economy has never had it so good . . ."

The facts are: only about 1 pct of England's labor force is unemployed; wage rates are up roughly 5 pct from last year; industrial production has gained 6-7 pct; steel and auto production are running well ahead of last year; exports have gained 7 pct from same period last year; consumer spending has increased 2½-3 pct; prices have remained stable.

Significance of these developments is that Europe, thanks to the billions of dollars the U. S. has invested in it since the war, has now attained a fair degree of economic independence.

This is vitally important to the U. S. It means we haven't wasted our money in trying to bolster Europe and that these nations are in a better position to resist an internal rise of Communism.

And Europe's stronger economy also means that when business activity slips over here, we have a better chance for a fast recovery.

It was just about a year ago that the first signs of the U. S. recession began to show up. National Assn. of Purchasing Agents' monthly business survey last August showed purchasing agents reporting the expected August pickup as disappointing and that the fall pickup might be slow in coming.

For August of this year purchasing agents though not unboundedly optimistic are definitely more confident than in '53.

Increases in production, new orders are reported by substantially greater numbers of purchasing agents than last year. The increases are not large but do confirm the trend toward gradual improvement that started in March.

Have you spotted a bright young engineer you want to take on but are holding up on the move because of his touch-and-go draft status? You can take more chance on hiring him this year than you could a year ago because it's more likely he can get an industrial deferment.

Reason for this is the currently light Army draft call of 23,000 per month (plus a pool of availables of 650,000). This means draft boards will ease up on their deferment policy.

If you're a member of a trade association you've probably been asked many times to write or wire your congressman to support or reject pending legislation affecting your industry.

Perhaps you've done this and maybe your congressman went along with your request. Chances are that was the end of the episode. It shouldn't have been.

A follow-up letter of thanks would have served as a second reminder of your industry's interests, would make your congressman more inclined to act on your future requests.

INDUSTRIAL BRIEFS

Opening . . . Borden Co.'s Chemical Div. announced the opening of a new distribution center to meet the increased formaldehyde needs of chemical and textile industries in the South Atlantic states.

Adopts Program . . . Peck, Stow & Wilcox Co., Southington, Conn., has started an expansion program in its machine tool division.

New Warehouse . . . Diebold, Inc., has a new warehouse for finished goods in Canton, Ohio.

Appointed . . . Jones & Lamson Machine Co., Springfield, Vt., have appointed L. W. Hodson Machinery Co., Cleveland, as a distributor of Jones & Lamson automatic opening die heads, chasers and fixtures.

Producing . . . Armco Drainage & Metal Products, Inc., Jefferson City, Mo., is scheduled to start production of corrugated metal pipe.

Celebrating . . . Motch & Merryweather Machinery Co., Cleveland, is celebrating its 50th anniversary.

Opens . . . Chain Belt Co., Milwaukee, Wis., has opened three new district sales offices. The new offices are located in Charlotte, N. C.; Cincinnati, and Moline, Ill.

Expanding . . . Newport Steel Corp. continues program for expansion of plant facilities and sales representation, also establishment of four additional district offices to service midwest and western states.

Open House . . . Indiana Steel Products Co., Valparaiso, Ind., will hold a special "family day open house" for the families of its employees.

Forming . . . Tolerance Castings Co., 424 Seventh Street, Rockford, Ill., was formed July 15 and will be engaged in the sale and engineering of precision, close tolerance castings.

Now Serving . . . Follansbee Steel Corp., Follansbee Metals Div., is now serving its New England customers from a new depot in Wallingford, Conn., and has closed its previous regional headquarters at Fairfield, Conn.

New Rep . . . Moehlenpah Engineering Inc., St. Louis, Mo., has been appointed representative for the Press-Rite Presses.

Relocated . . . Otto H. York Co., Inc., Yorkmesh DeMisters, and York Process Equipment Corp. have relocated their offices and plants to new, larger quarters at 6 Central Ave., West Orange, N. J.

Program Started . . . Rockwell Mfg. Co.'s Delta Power Tool Div. started a comprehensive educational-sales training program to better acquaint eastern dealers with features of its woodworking and metalworking power tools.

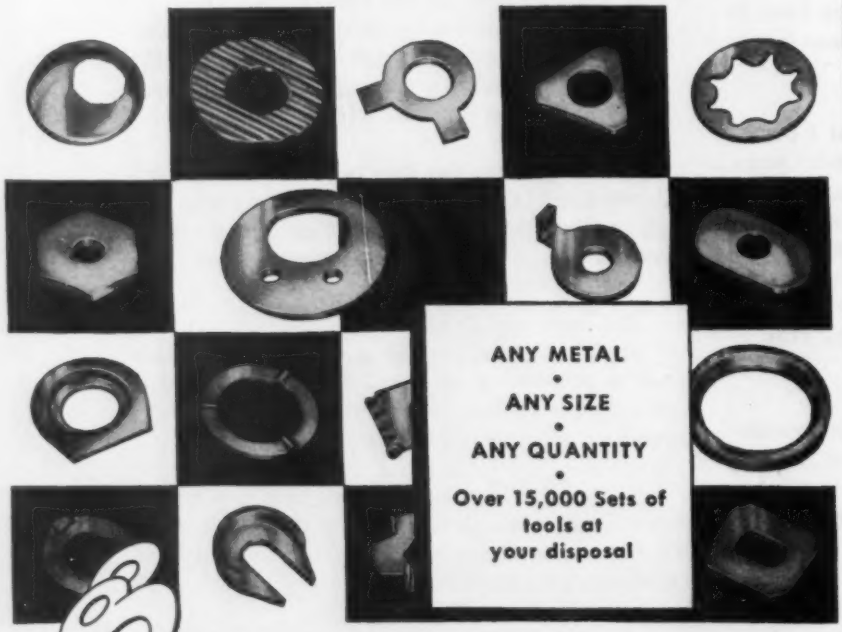
Moved . . . Trane Co., La Crosse, Wis., manufacturer of air conditioning, heating, ventilating and heat-transfer equipment, has moved its sales office in Greenville, S. C., to the Shives Bldg., 644 E. Stone Ave.

Sold . . . National Foundry Sand Co., Detroit, has sold Sonsel Refractories Co., Brighton, Mich. All assets of the Sonsel firm, including patents and processes, were acquired by the International Minerals and Chemicals Corp., Chicago.

IT'S A SMART MOVE TO ORDER

Special Washers

FROM A LEADER



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Equipped with high- and low-pressure pumps, these Bliss Hydro-Dynamic presses are the moving-up type . . . especially suited to industries employing sub-die processes. Their efficient, accurate operation is typical of results obtained with Bliss Hydro-Dynamic presses in all types of plants. At Gruen, *72% of the presses are Bliss-built.*

Let Bliss, the world's largest press builder, apply its long experience to *your* next press problem. Talk it over with a Bliss sales engineer. He can help you select the right press for your special requirements. Meanwhile, for more detailed information about Bliss Hydro-Dynamic presses, write for Catalog 30-A.

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AUTOMOTIVE ASSEMBLY LINE

New Models Start New Styling Cycle

Competitive market boosts frequency of styling changes . . . Chrysler forced to trim 3-year cycle, bring out complete new line for '55 . . . Olds body speedup last year paid off—By *R. D. Raddant.*

◆ THE NEW 1955 cars, which will begin to make their appearances in a few short weeks, not only will display broad new styling features, but will reflect an entirely new styling cycle.

What it boils down to is the fact that economics determine model changes. The tough competition today demands more frequent restyling than the industry has been able to get away with in the postwar and Korea demand period.

A striking example, of course, is Chrysler. All four Chrysler divisions were completely restyled for 1953. Intent at that time was to let that basic restyling run a 3-year cycle with faceliftings for 1954 and 1955.

Olds Paid Off . . . But scarcely were the 1954 models in production that the hand-writing appeared on the wall in terms of lost market percentages. The hurry-up decision was made to go all out for a complete new line for 1955. It was an expensive decision, but it had to be made.

Last year it is recalled that Oldsmobile was "the car that couldn't wait," with this BM division stating that its new body was originally scheduled for 1955, as was the smaller half of the Buick line which also uses the GM "B" body. Wisdom of the decision to push ahead is reflected in sales figures.

Pontiac had a new body in 1953 and waited only 2 years for a completely overhauled styling for 1955. It is doubtful if the 1953 body was scheduled for only 2 years, but that's all it lasted.

Tooling Costs Zoom . . . In the low-priced field, Ford's 1952 styling extended 3 years, and with tremendous success. However, it was helped by a new engine for 1954 even though basic styling remained unchanged. Chevrolet's present body was developed in 1953, although it could not be called an entirely new car at that time. There was no change from the original schedule which called for a new body and V-8 engine that will be seen in October as one of the first '55's to show.

If a 2-year cycle should become the rule, and it appears to be the case, it is another instance where the smaller companies will find it increasingly tough going. As stated here many times, tooling costs are astronomical and going higher.

Change Looks Only . . . Another result of the terrific desire for change may be that minor faceliftings such as adding a piece of chrome here and another there are through. It is known that Cadillac, for example, which certainly enjoyed tremendous success with its 1954 car, is going to make some radical rear end changes. Buick and Olds are also going to show more than a casual revision.

"The designers ran out of ideas—so you trim it to suit yourself."

One stylist pointed out to this column that the present designs lend themselves to easier revision, although there is no such thing anymore as changing a fender without revising the entire quarter.

Looking farther ahead, changes in body construction may revise the entire concept of a styling change as the trend to integral body construction continues. The purpose is undoubtedly to reach a point where a radical change in appearance can be accomplished without retooling for an entirely new body.

In this competitive business, if the demand for continuous change increases, the industry will find a way to do it economically.

Spells It Out . . . This seems to be the year to break precedent in labor relations. It started off with Willys workers taking a pay cut, then continued with Studebaker workers voluntarily voting themselves less pay, stricter contract.

While it apparently didn't involve wages and hours, L. L. Colbert, Chrysler president, last week walked into a UAW-CIO Chrysler Council meeting. Flanked by two labor relations aides, he reportedly talked turkey about Chrysler's competitive position, then told the union leaders the whole story about Chrysler's 1955 plans.

Object was two-fold. First, labor relations between Chrysler and

Automotive Production

(U. S. and Canada Combined)

WEEK ENDING	CARS	TRUCKS
Aug. 28, 1954...	95,259*	17,910*
Aug. 21 1954...	104,518	17,218
Aug. 29, 1953...	127,411	25,455
Aug. 22, 1953...	136,658	26,977

*Estimated. Source: *Ward's Reports*

its locals have never been of the best. The meeting was an attempt to build better understanding and make Chrysler workers conscious of the competitive stake they share with the company.

At the same time, Chrysler divisions were idling about 35,000 workers for an extended downtime period. Mr. Colbert undoubtedly promised the workers that Chrysler's new lines would assure them of better things to come.

Dead for '55 . . . While the contract was not discussed at the meeting, it is generally believed that it amounted to another nail in the coffin of the guaranteed annual wage, at least for 1955. The auto business is just too spotty for most companies to even consider the GAW.

At one time in Detroit, it was learned that one of the Big Three, while making sounds that the GAW was a fantastic and impossible thing, was actually figuring out some plans along that line. You can bet that these plans are buried deep in the future file today.

First Place:

Chevvy, Ford neck and neck as they enter stretch.

The Chevrolet-Ford neck-and-neck race for the No. 1 position looks like it will go that way down to the wire.

In fact, the final outcome may hinge on how much downtime each has between its 1954 production and the first full scale production of '55's. This is accounting for some of the biggest rush jobs in the industry to turn out new cars.

Ford appears to have won the first round with registrations (compiled by *Automotive News*) showing that in the first half of the year Ford sold 706,577 cars to 697,852 for Chevrolet's first half.

But just to show how hot the battle is, from Chevrolet sources comes the charge that Ford dealers registered thousands of demonstrators during June. This would place these cars on the registered list while still unsold at the retail level.

However, the battle is far from over. Chevrolet by late August had produced 973,746 cars to 948,250 for Ford. Since the new Chevrolet will hit the market some weeks before Ford, the old champ might still have the advantage in the last half.

Six Firms Shut Down

Late summer lull has hit the auto industry with an impact not felt since the late '40's. Six automotive producers were completely down. They included Plymouth, Dodge, De Soto, Chrysler, Studebaker and Kaiser-Willys.

Chevrolet, Pontiac and Cadillac are scheduled to close for new models in September. Lincoln, Mercury, Ford, Buick and Oldsmobile will start closing in October while Nash and Hudson will ease off '54 production somewhat later due to late introduction of '55 models.

AUTOMOTIVE NEWS

Sell Packard Engines

Packard Div. of the new Studebaker-Packard Corp. will get a substantial lift in writing off tooling costs of its new engine plant.

Although it is not official, it is a known fact that Hudson and Nash of American Motors will buy a Packard V-8, probably the smaller of two engines Packard will build. This should add nearly 100,000 units to the Packard demand, making the engine plant a profitable operation as a starter for S-P.

Ford Starts Stamping

Ford's giant stamping plant in Cleveland is now in token operation turning out hoods for Ford cars. Its 22 press lines, said to be the last word in stamping automation, will be in operation later this year.

The plant will turn out stampings for all three cars to be shipped to the network of 22 assembly plants. Present employment is just 300, only about one-tenth of what it will reach in full operation.

THE BULL OF THE WOODS **By J. R. Williams**

AH, THAT'S IT, HARRY! NOW OVER UNDER TH' OTHER SHOULDER BLADE AND DOWN A LITTLE!
TO TH' HILLS, BOYS! THEM BACK SCRATCHIN'S ALWAYS START ALL HIS OTHER AILMENTS YELLIN' WITH JEALOUSY! I DON'T MIND MASSAGIN' HIS PAIN IN TH' NECK, BUT IT TAKES TWO BATHS TO GET THAT LEG LINIMENT SMELL OFF OF YOU!
THE DRAFT EVADERS
9-3 J.R.WILLIAMS
T. M. Reg. U. S. Pat. Off.
Copr. 1954 by NEA Service, Inc.

REDUCE REDUCTION GEAR WEAR

WHEN YOU use *Texaco Meropa Lubricant* you'll get the effective lubrication that means greater protection against wear . . . assures longer life for gears and bearings and smoother, quieter operation.

Texaco Meropa Lubricant has notable EP characteristics that stand up through long service of the severest kind. In addition, *Texaco Meropa Lubricant* resists oxidation, does not thicken or foam, does not separate in service, storage or centrifuging.

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FOR STEEL MILL GEAR DRIVES

See Easing of Draft Deferments

If Armed Forces are maintained at present levels there will be a surplus of manpower . . . Deferment policy won't be eased, however, until government is sure no emergency is in offing—*By G. H. Baker.*

♦ LIBERALIZED DRAFT deferments may be in the offing. New government studies of the available manpower supply show that if the Armed Forces are to remain at the present level (3,030,000 men) for the next 5 years, there will be far more men available than needed.

Keep in mind, however, that war or all-out emergency will automatically cancel these plans. Easy-to-get deferments will only come about if Washington planners become firmly convinced that neither war nor a foreign crisis involving the U. S. is over the horizon.

Manpower experts in the government estimate that in the event of another emergency like the Korean crisis, enough men could be drafted in one year to push total U. S. armed strength to about 5 million men. It can be expected that draft deferments under this type of all-out mobilization will be very tough to achieve.

Go Abroad . . . Ike is urging businessmen to dig harder and deeper into potentialities for expanding foreign trade. He is calling attention to the tremendous potential markets that exist in nations like India, and tells U. S. industrial leaders to "go after" the mutually-advantageous business that will result from introduction of modern machinery and factory methods.

New developments in food processing and packaging are particularly in demand in areas that have huge populations to support.

Bid on A-Plants . . . Significant departure in procurement methods is apparent in the government's plans for buying pocket-size atomic power plants. For the first time in the history of Atomic Energy Commission, the government is asking for competitive bids instead of letting contracts on a negotiated (cost-plus) basis. AEC has selected 33 companies as eligible to bid on the new business.

While this is a limited list of firms, the point is that the Eisenhower Administration has at least opened the door to competitive bidding on atomic contracts. As more and more firms demonstrate their technical ability to perform successfully on AEC contracts, the door will be opened wider.

Notes on the pocket-size power plant: All components must be transportable by air. The entire plant is to be housed in a building 80 ft long, 29 ft wide, and 42 ft high. Advantage to the Army: The new plant will reduce tremendously the amount of fuel required in military operations, thereby reducing cost, easing transportation problems.

"I started out in February of '46 with next to nothing. By March I had nothing."

ODM Streamlining . . . Consolidated into a single expansion goal by a new Office of Defense Mobilization action are former goals covering facilities for producing six categories of items essential to national defense.

In what is described as a bookkeeping operation, ODM set a single goal for these production fields: military aircraft, metal ammunition boxes, military vehicles and engines, military electronic products, military photographic equipment, and ordnance facilities.

Tax Writeoff Available . . . Facilities eligible for fast tax writeoffs will be those believed needed to cover an existing or prospective shortage, as compared with military or AEC requirements.

Fast tax writeoffs also will be available, under the new goal, to "one-of-a-kind" facilities for which expansion goals have never been set, as well as special-type facilities whose products or services normally would fall into the category of a goal already closed.

Spend More Overseas . . . Spending abroad by U. S. military forces this year now looks like it will exceed last year's record $2.5 billion. Outlays in Japan ($775 million last year) and in France ($400 million) will continue to outrank other areas around the globe in U. S. defense plans.

Funds spent by the U. S. government for purchase of goods and services in the U. S. are not included in these totals.

Publication date of Sept. 10 has been set for the first issue

CRUCIBLE REXWELD hard surfacing rods increased forging die life OVER 400%

for R. G. LeTourneau, Inc.

By Rexwelding, R. G. LeTourneau, Inc., Longview, Texas, increased the life of its production dies over 400%. The dies shown, for example, used to forge a plug adapter of SAE 1030 steel at 2350 F, had to be removed from the press after forging 3100 pieces because of excessive wear and heat checking. The same die, after worn areas were machined out and faces built up with Rexweld-A hard surfacing rod, produced 9300 pieces.

You can do the same in your shop. You'll find that Rexwelded dies have higher edge strength at elevated temperatures, and resist chipping, deformation and heat checking better. And parts can be Rexwelded over and over.

So, use Rexweld Rods on your next hard surfacing application. They are available in both bare rods and low hydrogen coated electrodes, in a wide range of grades and sizes. Call your local Crucible representative — he can provide a grade of Rexweld adapted to your specific job.

CRUCIBLE first name in special purpose steels

54 years of *Fine* steelmaking

REXWELD HARD SURFACING ROD

CRUCIBLE STEEL COMPANY OF AMERICA, GENERAL SALES OFFICES, OLIVER BUILDING, PITTSBURGH, PA.

of the government's atomic-age defense manual for the iron and steel industries. The manual was prepared jointly by selected industry representatives and by officials of William Kerber's Iron & Steel Div., Business and Defense Services Administration.

American Iron & Steel Institute has taken over the printing and distribution of the manual. Copies can be obtained by writing AISI, 350 Fifth Ave., New York 1, N. Y., for the "Industrial Defense Planning Manual."

Bicycles:

U. S. manufacturers hope for higher tariffs.

Domestic bicycle manufacturers will make a new bid to put the brakes on foreign competition at a hearing before the U. S. Tariff Commission in Washington Sept. 21.

The bikemakers, loosing a war to invading "lightweights," are asking Tariff Commission officials to recommend to President Eisenhower that rates on imported bikes be increased to wipe out the price advantage enjoyed by foreign manufacturers.

The increases could be made under the "escape clause" of the Reciprocity Trade Agreement Act which permits modification of rates when a domestic industry shows a serious injury or threat of injury from foreign competition.

Two years ago, the industry lost a bid for tariff relief when the Commission, by a split vote, found there was insufficient evidence that "serious injury" had occurred or was threatened.

Imports Up 40 Pct

To show that the domestic bikemakers are troubled by foreign imports, the Bicycle Institute of America points out that duty rates on foreign bikes were cut from 30 pct to as low as 7½ pct in 1949. Simultaneously, the British led several nations in a currency devaluation, thus affecting the equivalent of another 30 pct duty reduction.

As a result, the Association says, imports of foreign-made cycles jumped from the prewar average of 16,000 a year to 67,000 in 1950 and 595,000 in 1953. Imports this year are running 40 pct ahead of last.

Sales of domestic bikes dropped 46 pct, from 805,610 in the first six months of 1953 to 436,000 in the same period this year, the industry says.

Employment Steady

New figures compiled by U. S. Labor Dept. show the employment situation in manufacturing industries is generally unchanged from the early summer status.

While the hiring rate dropped seasonally from 35 per 1000 in June to 30 in July, the decline in a number of industries was less than usual for the time of year. Primary metals, transportation equipment, and instrument making were among the fields in this category.

General factory layoff rate, at 17 per 1000, was unchanged from the previous month.

Factory quit rate, 11 per 1000, was unchanged for the eighth consecutive month. It was the lowest quit rate for any July in recent years.

In the primary metals industry, the rate was only 6 per 1000.

Continue Free Scrap Duties

President Eisenhower has signed a measure continuing until next June 30 suspension of duties and import taxes on metal scrap, except lead and zinc scrap.

The measure, backed by the Defense Department (which fears re-

imposition of duties would increase the cost of military procurement) continues existing import tax on lead scrap. Zinc scrap also remains subject to duties unless imported under a contract dated prior to last July 1.

Scrap:

Census shows long-term business gain, but 1953 decline.

Government estimates, newly disclosed, indicate a gain of more than 10 pct in the dollar value of sales by iron and steel scrap dealers from 1948 to 1953.

As determined by U. S. Census Bureau, ferrous scrap sales by dealers last year amounted to $1.85 billion. The recorded figure for 1948 was $1.68 billion.

However, sales declined by 4.7 pct from 1952 to 1953.

Dealers' operating expenses, not including cost of materials, totaled $217 million, or more than 11 pct of sales, last year. This percentage compared with the 9.6 pct ratio shown for 1948.

More Dealers Listed

Scrap held by dealers at the end of 1953 was valued, at cost, at $88 million. At the end of 1948, the value placed on stocks was $52 million.

Dealers, who numbered 3,114 last Dec. 31, showed end-of-year receivables of $93 million. There were 2,568 scrap dealers at the end of 1948.

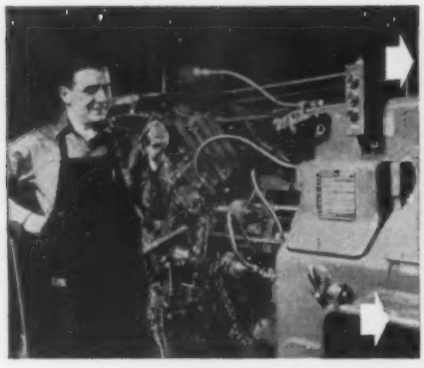
Extend Renegotiation

Renegotiation of defense contracts is extended by Congress—but on a reduced scale. All contracts valued at less than $500,000 are now exempt. Up to now, only contracts valued at less than $250,000 have been exempt from renegotiation.

Extension of the law runs until Jan. 1, 1955, and is retroactive to Jan. 1, 1954.

Standard commercial articles are exempt from renegotiation.

HERE'S WHAT HAPPENS WHEN REPUBLIC'S 3-D METALLURGICAL SERVICE GOES INTO ACTION



The field metallurgist comes right into your plant. He checks furnace temperatures and heating cycles, machines, set-ups, feeds, speeds, everything which affects your production.

He talks to your plant and engineering people, asks questions, finds out what you want your alloy steels to do. He takes this data with him.

The Republic Field Metallurgist talks over his report with Republic's Mill Metallurgist. Experienced in producing alloy steels, he adds his knowledge, checks it against your problem. And since Republic controls its alloy steels from ore to finished product, he can trace heats of steel.

The field metallurgist next talks things over with the Republic Laboratory Metallurgist. His data on tests of alloy steels is added to the material of the field and mill metallurgist.

Then, all three men put their heads together and come up with a recommendation that is the result of pooling their findings and their experience with alloy steels. And since Republic pioneered the manufacture of alloy steels, this recommendation is based on solid data.

The Republic Field Metallurgist passes this recommendation on to your engineers and plant personnel. He works with them to see that your problem is solved satisfactorily, right in your plant. It's his job to see that you get all the advantages out of the alloy steels you use.

The results often include lower production costs, better quality, or even changes in design. You can have this free service by calling your local Republic Steel sales office.

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REPUBLIC STEEL

Other Republic Products include Carbon and Stainless Steels—Sheets, Strip, Plates, Pipe, Bars, Wire, Pig Iron, Bolts and Nuts, Tubing.

Kaiser Aluminum Reports Record Year

Sales for fiscal 1954 up 24 pct, earnings rise 19 pct . . . Kaiser will soon complete expansion, account for 27 pct of U. S. production . . . Reynolds Metals firms plans for rolling mill—By *R. R. Kay.*

♦ RECORD SALES and a sharp gain in earnings show up for Kaiser Aluminum & Chemical Corp. at its May 31 fiscal year end. Sales of $226,641,000, up 24 pct over last year's $182,653,000, set a new company record. Net earnings were 19 pct above last year: $14,016,000 or $3.36 a common share vs. $11,768,000 or $2.86 a share.

Company reports major progress in stimulating aluminum sales for: building, transportation, power distribution, irrigation, electronics, food packaging.

Kaiser's big, 3-year $230 million construction program, almost completed, increases its annual aluminum capacity to over 800 million pounds, about 27 pct of U. S. primary production.

Reynolds Metals Co. will definitely build an aluminum sheet rolling mill on the Pacific Coast if the Canadian $270 million power and metal development goes through. "This is the first time we've been able to make such a positive statement about it," J. Louis Reynolds, vice-president for operations, told THE IRON AGE on a Los Angeles stop after conferring with Canadian officials.

Alaska is getting the eye from U. S. Steel as a possible source of iron ore. A Corporation team, headed by Dr. James A. Noble of California Institute of Technology, is at work on Prince of Wales Island which has known deposits of magnetite.

Show Electronic Progress . . . Complete automation was the magic word for tomorrow at the Western Electronic Show & Convention. Six hundred electronic products showed what's new today. Engineers, scientists, and industrialists came by thousands to Los Angeles from all over the country to see and learn.

William R. Hewlett, president, Institute of Radio Engineers, said that for industry in general, the ratio of investment in machinery and equipment to sales is $70 to $100; in the electronics industry, the ratio is a small $9 to $100 . . . And T. P. Walker, vice-president, Triad Transformer Corp., pointed out that the relatively low capital investment required permits small companies to compete successfully with large. "Ninety pct of Southern California's electronics business comes from companies with less than 500 employees." (THE IRON AGE, July 29, 1954, p. 75.)

Need More Scientists . . . Dr. A. M. Zarem, Stanford Research Institute, estimated U. S. industry could use another 40,000 engineers and 5000-10,000 scientists. He quoted figures showing Soviet Russia's highly integrated technical program will produce 50,000 engineers this year, while U. S. will graduate only 17,500. "Time is not on our side. . . . And in lieu of more graduating engineers, we must discover ways of putting those we have to better use."

Break For Shipbuilders . . . West Coast shipyards will get $3.5 million, a 29 pct share of the modernization program for mothballed merchant ships under the Emergency Ship Repair Act. This is one answer to the plight of shipyards hard up for work. Other answers will be sought in the fall when the House merchant marine committee, headed by acting chairman Rep. Thor C. Tollefson (R., Wash.), holds hearings in West Coast shipbuilding centers.

Conversion of the carrier *Franklin D. Roosevelt* will produce a whopping 3500 tons of 12½ ft wide scrap plate, to go from Puget Sound (Wash.) Naval Shipyard to U. S. Steel mills in the East. Estimated shipping cost is $85,000.

Although neither the Air Force nor the company would confirm, it is believed that the new Boeing Airplane Co. contract is for 88 jet-powered 707 Stratotankers to cost the USAF about $500 million. The new order would bring the company's backlog close to $3 billion.

East Meets West . . . Merger plans are in the works for Oliver United Filters, Inc., Oakland, Calif., and Dorr Co., Stamford, Conn. The industrial filter manufacturing firm and the engineering concern will become Dorr-Oliver, Inc., with headquarters in Stamford. Sales for the two companies in 1953 totaled $23 million.

The significant results of

THE FIRST 120 DAYS OF TOOL-LEASE

A report by Francis J. Trecker, President, Kearney & Trecker Corp.

JUST four short months ago — as this is written — Kearney & Trecker demonstrated again its leadership in the machine tool industry by pioneering a program, unique among machine tool manufacturers, whereby its products might be obtained on a lease basis, as well as by outright sale or conditional sales agreement.

The results of the Kearney & Trecker TOOL-LEASE program have exceeded even our most optimistic forecasts. It has been a great stimulant of inquiries and new business, particularly where the replacement of worn and obsolete milling and precision boring equipment has been under consideration.

At this time the TOOL-LEASE program has been responsible for several million dollars' worth of new business. The success of this program is ample evidence that our decision to lease was founded on a correct appraisal of the needs of metalworking industry for some way to modernize its plant equipment without delay where working capital for the moment must be used for other purposes. In this respect TOOL-LEASE is serving a practical and useful purpose, and we are both pleased and grateful for the acceptance this program has been accorded.

The Kearney & Trecker TOOL-LEASE program today is an integral part of our company's general sales policy. The soundness of the program is evidenced — not only by the 120 day record of leases made by large and small companies alike — but also by the many complimentary letters received from leading figures in almost every executive capacity in business and industry.

Today our sales organization is fully prepared to explain the details of the Tool-Lease program to anyone interested. Briefly, it offers a choice of three basic plans with varying options to continue the lease, terminate the lease or purchase the equipment.

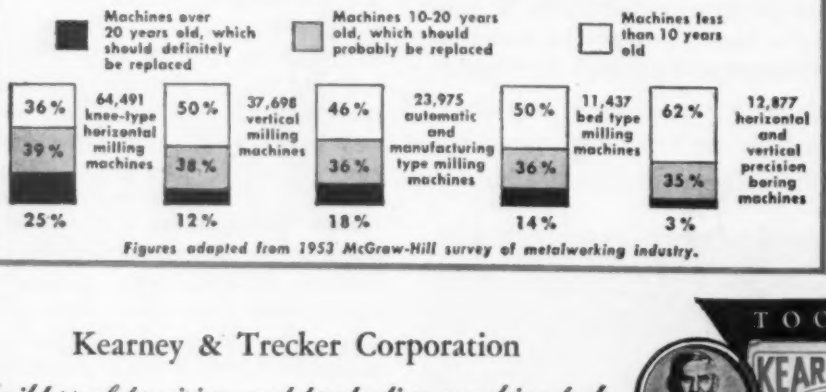
FRANCIS J. TRECKER, *President*
Kearney & Trecker Corporation

Among the proved advantages of Tool-Lease are: Releases working capital for production expansion. Assures you the services of a machine as long as needed, avoiding risk of obsolescence. Permits user to judge machine's merits in actual shop performance without going to expense of purchasing the machine.

We invite your letters of inquiry. For complete details on Tool-Lease including actual costs . . . for prompt service and assistance in analyzing your plant modernization problems — contact the Kearney & Trecker sales representative in your area.

Ask for Tool-Lease Bulletin TL-10A and booklet titled "Critical Picture of Creeping Obsolescence." Write or call Kearney & Trecker Corporation, 6784 W. National Ave., Milwaukee 14, Wisconsin. Phone: GReenfield 6-8300.

Milling and Boring machine obsolescence is CRITICAL! Overall picture in 16 basic industries shows more than 50% need replacement.



Figures adapted from 1953 McGraw-Hill survey of metalworking industry.

Kearney & Trecker Corporation

builders of precision and production machine tools since 1899

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KEARNEY & TRECKER
MILWAUKEE
MACHINE TOOLS
EQUIPMENT ®

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Orders Plummet to Post-Korea Low

New tool order index for July 61.3 points below June . . . Shipments down too . . . ODM mobilization plans offer hope, but relief would be a long time coming . . . Expect last quarter pickup—By E. J. Egan, Jr.

♦ NEW ORDERS for U. S. machine tools skidded sharply in July, touching their lowest level since the Korean emergency began in June, 1950.

Preliminary July index of the National Machine Tool Builders' Assn. pegs the latest new order rate at 123.9. This is 61.3 points under the June mark of 185.2 and slightly below the June, 1950, rate of 124.1.

Severity of the machine tool industry's decline since the Korean outbreak is apparent in comparing July new order rates of the past few years. Last July new business was thumping in at a 247.3 rate. In July, 1952, the level was 376.3, and for the same month in 1951, new business came booming in at a 490.6 clip.

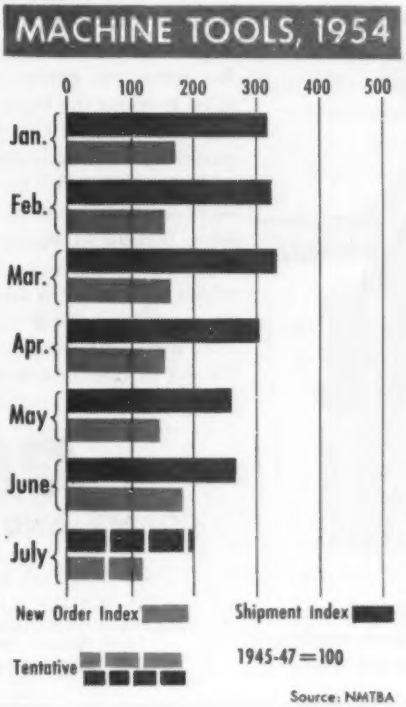
Shipments Off Too . . . Machine tool shipments in July reflected the lagging sales trend of recent months. Preliminary NMTBA shipment index for the month dipped to 204.7 from the June figure of 267.3 and touched the lowest point in this category since the September, 1951, rate of 189.9. In July last year, the shipment index was set at 267.6.

Base rate for these NMTBA index classifications is 100, and was established during the post-World War II period of 1945 through 1947. The industry has sold and shipped machine tools at levels below this norm, especially in 1948 and 1949. But builders don't want to repeat those years.

Backlog at 3.4 Months . . . Machine tool backlogs are presently estimated at 3.4 months, not nearly enough for real peace of mind in builders' sales and production departments. Company officials attribute much of the sales slump to summer vacation schedules throughout the metalworking industry, will be delighted to see these come to an end soon.

Big hope among builders is that a slow, steady upturn in sales will come as the last quarter gets underway.

This hope for better business is based on several assumptions. Newly announced government plans to maintain war production facilities on a complete standby basis should help. Some new and many continued appropriations for "current use" military items will account for a certain amount of the new machine tool orders.



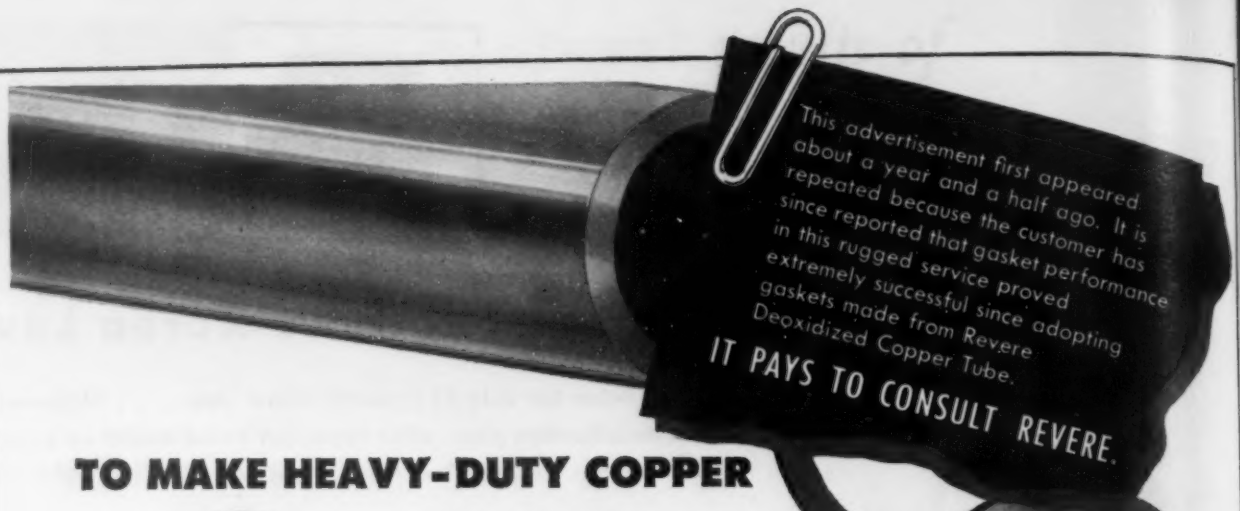
In the non-defense area, better, more productive machines and liberalized tax depreciation allowances should continue to wear down buyer resistance to replacement of obsolete equipment.

ODM Moves In . . . On the government side, Office of Defense Mobilization took another step toward its announced goal of establishing a sturdy mobilization base for any possible war emergency. This was done when ODM director Arthur S. Flemming last week issued an order outlining the steps by which essential production facilities would be maintained ready for instant use.

Details of the plan are still to be spelled out, but maximum preparedness procedure will be set up and kept in order by the Defense Dept., Atomic Energy Commission and the Maritime Commission.

Kept in Reserve . . . Idea is to define specifically the critically important needs of these three areas in the event of war. Where facilities are available to produce the needed items, plants and machinery (even some key personnel) will be kept on reserve.

Where production facilities are not available, they will be obtained as soon as possible. This could mean complete plant and equipment setups in some cases. But to stretch budget dollars as far as possible, effort will probably be concentrated on building and storing long lead time equipment.



This advertisement first appeared about a year and a half ago. It is repeated because the customer has since reported that gasket performance in this rugged service proved extremely successful since adopting gaskets made from Revere Deoxidized Copper Tube.

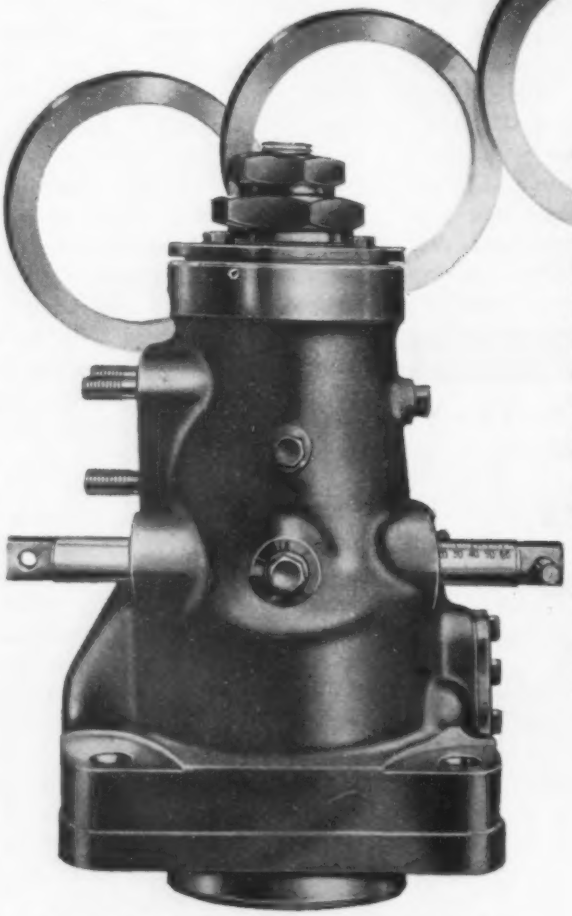
IT PAYS TO CONSULT REVERE.

TO MAKE HEAVY-DUTY COPPER

Gaskets

USE REVERE DEOXIDIZED

Tube!



Diesel Fuel Injection Pump, made by American Bosch Corp., Springfield, Mass., and gaskets made by cutting rings off 2" deoxidized copper tube.

• An important extra service rendered by Revere consists of collaboration in setting up specifications. This is valuable because there are many different Revere Metals, each with special characteristics. No one copper, for example, will serve to best advantage in every application. A case in point is the matter of copper gaskets for Diesel fuel injection pumps. Copper is of course an ideal metal for gaskets, and is widely used for that purpose. But for this special application, which copper and in what form? The pump is used on large engines for municipal generating plants. It weighs 186 pounds, and must produce the high pressure required to inject fuel near the top of the Diesel compression stroke. Naturally, the load is a pulsating one. American Bosch Corporation came to Revere with the problem. Our suggestion was that much scrap could be saved if the gaskets were made by cutting rings off copper tube, instead of stamping them from strip. This achieved a double purpose, since the tube is made of deoxidized copper, which is superior in this application to electrolytic. We are able to report that these recommendations proved successful.... This work was done by the Revere Technical Advisory Service. To get in touch with it, see the nearest Revere Sales Office.

REVERE

COPPER AND BRASS INCORPORATED

Founded by Paul Revere in 1801

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• • •

Mills: Baltimore, Md.; Chicago and Clinton, Ill.; Detroit, Mich.; Los Angeles and Riverside, Calif.; New Bedford, Mass.; Rome, N. Y.— Sales Offices in Principal Cities, Distributors Everywhere.

SEE "MEET THE PRESS" ON NBC TELEVISION, SUNDAYS

The Iron Age SALUTES

John G. Berry Energy and top-flight sales ability enabled him to form his own company before he reached 40 . . . a restless, creative mind insures the firm's continued success and growth.

While most steel warehousemen were complaining about business conditions last winter, Jack Berry, president of Kenilworth Steel Co., made plans to meet the challenge of the buyer's market.

He organized a week-long open house at his plant, called it the Kenilworth Klinic, invited purchasing agents, engineers and metalworking executives from manufacturing plants throughout the East, to contribute new ideas, equipment for better metalworking.

Over 6000 came to the newly expanded plant, watched shearing, slitting, leveling and edge-rolling equipment at work, got a new perspective on what Kenilworth's warehouse operation could do for them in time and money-saving service.

Many of Kenilworth's old customers discovered that the organization handled a diversified line of products that they needed and were getting elsewhere. Result—boosted business for Jack Berry's Kenilworth Steel.

Jack got an early start in the sales end of the steel business when he graduated from University of Pennsylvania's Wharton School of Business in 1940. His first job was as a sales trainee for Carnegie-Illinois Div. of U. S. Steel Corp.

World War II took Jack out of the steel business for several years. When he returned he became manager of stainless sales for Edgecomb Steel Corp. in Hillside, N. J. In 1949 Jack left Edgecomb to organize Kenilworth Steel which opened for business in the summer of 1950.

Jack's interest in the welfare of his industry as a whole has prompted his very active membership in the American Steel Warehouse Assn.; he's currently on the public relations committee.

Just turned 40, Jack has already been a member of the Young Presidents Organization for several years. A recently added responsibility is his service on the Advisory Board of the National State Bank of New Jersey.

Golf and sailing occupy Jack's leisure hours when he's not at home in Short Hills with his wife and three children.

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Sets New Records for Production and Accuracy . . . Reduces Costs . . . Replaces Other Methods for Producing a Great Variety of Work! Note These Advanced, In-Built Features!

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- **Automatic positive size control** — The wheel slide is held against positive stops with uniform hydraulic pressure.
- **Automatic trueing device** with controlled dressing.
- **Automatic or manual handling.**
- **Complete versatility** — chucking work, center work or shoe-type grinding; crush wheel or diamond trueing.
- **Compact design** — affords exceptional accessibility and simple set-ups.

P.S.

Write for illustrated folder — gives complete specifications and examples of how the Model "E" does jobs faster, better and more economically.

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Machine Tool Craftsmen Since 1835

JONES & LAMSON MACHINE CO., 511 Clinton St., Dept. 710, Springfield, Vt., U.S.A.

J&L MACHINE TOOL DIV.

The Iron Age INTRODUCES

John C. Freeman, becomes president, **National Industrial Advertisers Association,** New York.

E. P. Riley, named vice-president, Accessories and Turbine Drive Div., Tapco, and Commercial Pump Div., Cleveland Main Plant, **Thompson Products, Inc.,** Cleveland, and **Pierce T. Angell,** named manager, Accessories Div.

Keith D. Graham, Andrew J. Rebmann, and **Leon J. Dunn,** elected vice-presidents, **Veeder-Root Inc.,** Hartford, Conn.

S. W. Voorhes, becomes manager, **Century Engineers, Inc.,** Dayton, Ohio.

Edward H. Heath, appointed manager, Quality Control, **Howell Electric Motors Co.,** Howell, Michigan.

Charles H. Day, becomes manager, Omaha metal can plant, **Continental Can Co.**

Charles A. Kuhnmuench, appointed manager of sales, Pittsburgh-Cleveland area, **Trent Tube Co.,** Pittsburgh.

Norman B. Thirion, vice-president in charge of sales, and director of the company, **American Window Glass Co.**

Edward F. Peck, becomes advertising and publicity manager, **Continental Foundry & Machine Co.,** Pittsburgh.

L. C. Schweitzer, appointed assistant general manager, TOCCO Div., **The Ohio Crankshaft Co.,** Cleveland.

Kenneth P. Martin, becomes general sales manager, **National Automatic Tool Co., Inc.,** Richmond, Indiana.

Leonard L. Hank, promoted, general production manager in charge of gypsum, paper and insulation board plants, **The National Gypsum Co.,** Buffalo.

George A. Bentley, becomes manager of sales, Central Div., Detroit headquarters, **Townsend Co.**

George W. Hartung, appointed assistant treasurer, **The Peoples Natural Gas Co.,** Pittsburgh.

Clifford R. Boeckler, appointed district manager of new Western New York Territory office, **Niagara Machine & Tool Works,** Buffalo.

William D. Crawford, appointed district manager, New York and Pennsylvania district, **The National Supply Co.**

Edwin C. Goetemann, appointed district manager, **Universal-Cyclops Steel Corp.,** Bridgeville, Pa.

Richard L. Bedell, becomes branch manager, Rochester, New York, office, **Sterling Electric Motors, Inc.**

Robert Hoffman, named western regional manager, Electro Dynamic Motor-Generator Div., **General Dynamics Corp.,** Bayonne, N. J.

Thomas O. Carson, named assistant product manager, Nordstrom Valves, International Div., **Rockwell Mfg. Co.,** New York.

Cooper M. Schley, joined the sales organization, **Pennsylvania Salt Mfg. Co.,** Philadelphia.

G. W. Benbury, named assistant general purchasing agent, **Pennsylvania Salt Mfg. Co.,** Philadelphia.

HERBERT A. GUMZ, elected president and chief executive officer, CRESCENT INDUSTRIES, INC., Chicago.

AUBREY H. MILNES, promoted, executive vice-president, THE STEEL IMPROVEMENT & FORGE CO., Cleveland.

STEPHEN L. INGERSOLL, appointed executive vice-president, Ingersoll Steel Div., BORG-WARNER CORP., Chicago.

PETER ROBERTSON, becomes vice-president in charge of planning and development, REPUBLIC STEEL CORP.

W. R. Davies, appointed section manager of commercial, industrial and flood-lighting products, Lighting Div., **Westinghouse Electric Corp.,** Cleveland; **H. C. Smith,** becomes manager of specialties section; and **W. S. Kolb,** named assistant to the Lighting Div. sales manager.

Alex T. Hinson, appointed belting sales representative in south central states, **The Russell Mfg. Co.**

Charles J. Daley, joined sales department, **Roll Formed Products Co.,** Youngstown, Ohio.

Donald R. Hoover, appointed sales representative, Chicago area, **Vulcan Stamping & Mfg. Co.,** and **Vulcan Tin Can Co.,** Bellwood, Ill.

John Zytell, promoted to engineering, Metal Finishing Waste Disposal Dept., **Frederic B. Stevens, Inc.,** Detroit; and **Robert James Amis,** named chief draftsman, Engineering Dept.

Ambrose L. Duggan, appointed to direct instituted sales coordination program, **Magnesium Co. of America,** East Chicago, Indiana.

William H. French, appointed director of purchases, **Trailmobile Inc.,** Cincinnati.

Virgil C. Rice, named director of manufacturing, Norge Div., **Borg-Warner Corp.,** Chicago.

Elmer R. Kaiser, appointed director of research, **The American Society of Heating and Ventilating Engineers,** New York.

Samuel Victorsohn, elected chairman of board and president, **John B. Salterini Co., Inc.,** New York.

Robert L. Ford, named Midwest regional manager in Chicago, **Deluxe Saw and Tool Co.,** subsidiary of Rockwell Mfg. Co.

Beverly Houston, appointed assistant controller, **The De Laval Steam Turbine Co.,** Trenton, N. J.

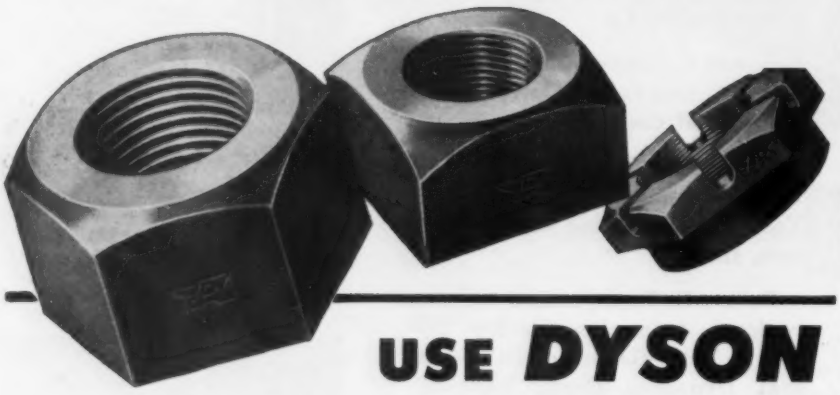
EDWARD C. HAMM, named vice-president and director of sales, THE COLSON CORP., Elyria, Ohio.

JACK E. HEUSER, named vice-president in charge of sales, LE ROI CO., Milwaukee.

JOSEPH E. SMITH, JR, appointed manager, Gage and Spindle Div., BRYANT CHUCKING GRINDER CO., Springfield, Vermont.

RANALD M. GARRISON, appointed manager of manufacturing, HANSON - VAN WINKLE - MUNNING CO., Matawan, N. J.

FOR YOUR **LARGE** FASTENERS



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Hex - Square - Round

Heavy, Regular, Full, Half, Jam, Sleeve, Mechanic's, Castle, Jack, and Slotted Nuts . . . Also Large Nuts to Your Engineered Specifications . . . Adequate Steel Stocks, Machining and Heat Treating Facilities Assure Prompt Service . . .

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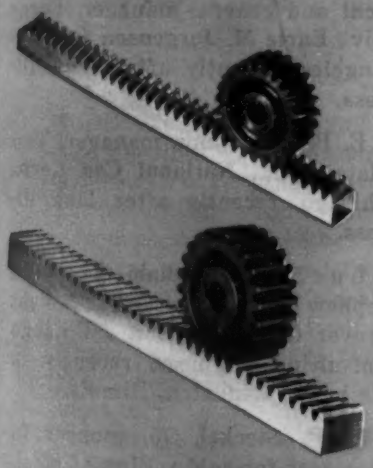
..small
..spur
..helical
..heavy pitch
..fine pitch

GEAR RACKS



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..any size

..any type

..any material

To change rotary power to linear power, there's an Illinois Gear Rack for the job . . from large, powerful heavy pitch racks for steel mill equipment to spur or helical precision racks for machine tools.

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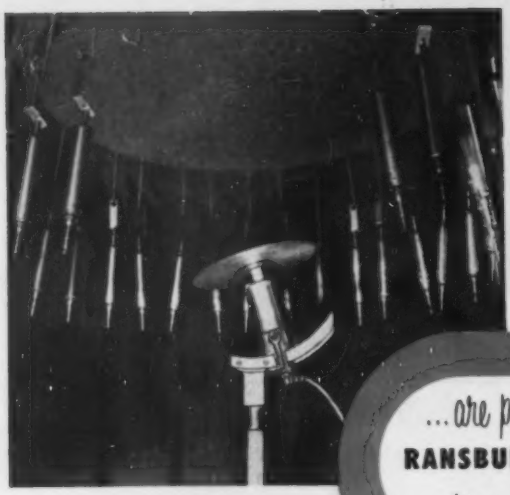


A leader in the field, The Gabriel Company, Cleveland, uses the Ransburg No. 2 Process to apply the protective coating to its line of shock absorbers which vary in size from 4" to 26" in length.

Shock Absorbers

...are painted with the
RANSBURG NO. 2 PROCESS
using disc-type atomizer

● Efficiency and production in the finishing of shock absorbers progressively improved at The Gabriel Company, when—over a period of years—they went from dip to Ransburg No. 1 Process, then to the Ransburg No. 2 Process, with the disc-type atomizer.

Efficiency was stepped up measurably when the No. 1 Process of electrostatic spray painting replaced dip method in the application of the protective coating to the completely-assembled shocks.

NOW, with the even-more-efficient No. 2 Process—with disc-type atomizer—Gabriel is painting 1000 pieces per gallon of paint where they formerly finished 350! Production is up, too—almost doubled—jumping from 1000 to nearly 2000 units per hour. In addition to paint savings, they are getting a consistent, high quality finish and an even, protective coating over all areas of the product.

This is another on-the-job example of what Ransburg No. 2 Process is doing on production lines all over the country. We'd like to talk to you about the possible savings in your finishing department. Or, write for our brochure on Ransburg Electrostatic Painting Processes.

Ransburg **ELECTRO-COATING CORP.**
Indianapolis 7, Indiana

RANSBURG

Robert L. Lewis, becomes assistant director of contract administration, **Temco Aircraft Corp.,** Dallas, Texas.

William D. Gohr, appointed director of Defense Activities, **The Firestone Tire & Rubber Co.,** Akron, Ohio.

Howard B. Huntress, appointed director of research, Sintermet Div., **American Brake Shoe Co.,** New York.

Donald L. Harris, joins staff, Davis Boring Tool Div., **Giddings & Lewis Machine Tool Co.,** Fond du Lac, Wisconsin.

H. J. Crain, appointed sales engineer, **Modern Industrial Engineering Co.,** Detroit.

C. J. Washing, appointed sales engineer, Connecticut, Rhode Island, New Jersey, Delaware, and Maryland territory, **Wiretax Mfg. Co.**

Alvin R. Reinarz, appointed administrative engineer, **The National Supply Co.,** Toledo, Ohio; and **Richard N. Cordrey,** becomes chief designer.

OBITUARIES

L. L. Willfong, 75, vice-president and general manager, Forge Div., **Earle M. Jorgensen Co.,** Los Angeles, recently after brief illness.

E. B. Huesmann, manager, Tinplate Dept., **National Can Corp.,** Chicago, recently after long illness.

Lucien Ingraham Yeomans, nephew of former President Grover Cleveland, and a Chicago consulting engineer, recently in his home, Evanston, Illinois.

A. P. Steckel, 75, pioneer in processes for cold rolling of steel, recently in his home, Youngstown, Ohio.

Ledyard Cogswell, Jr., chairman of board of directors, **Pittsburgh Tube Co.,** Pittsburgh, recently.

Adrian Joyce, 82, chairman of board, **Glidden Co.,** recently, in Cleveland.

The Iron Age
FOUNDED 1855
TECHNICAL ARTICLES

From 1 to 250 microns—

Particle Size Distribution Analyzed Quickly, Accurately

By F. S. Eadie, Staff Physicist and R. E. Payne, Chief Physicist
Research Laboratories, The Sharples Corp., Bridgeport, Pa.

♦ Control of particle size distribution determines quality in many products made from powdered materials . . . Now, with a new analyzing instrument, particle size distribution can be determined more rapidly and more accurately for particle sizes from 1 to 250 microns.

♦ The instrument overcomes limitations and disadvantages of other methods . . . A cloud of dry particles is introduced at the top of a sedimentation column . . . These fall to the pan of a sensitive recording balance . . . A cumulative weight curve plotted against particle diameter is obtained directly from a recorder chart . . . Applications are in powder metallurgy, ceramics, abrasives, powder cutting and air pollution control.

♦ DETERMINATION and control of particle size distribution of powdered materials in the sub-sieve range is now being done quickly and accurately in several industries. Use of a new analyzing method has resulted in improved physical properties and better product quality in metal parts, ceramic coatings, abrasives and other products made from powdered materials. These advantages have been made possible by the Micromerograph, a new analyzing instrument.

With the Micromerograph, particle size distributions of dry powders with particle sizes from 1 to 250 microns are easily obtained. Among the powders which have been analyzed are iron, tungsten, alumina, gold, zinc oxide, iron oxide, silicon carbide, graphite, activated carbon, lime hydrate, sulphur, limestone, kaolin, plastic molding powders, synthetic ion exchange resins, cracking catalyst, and diatomaceous earth.

Powders used in industry range in particle size from the large particles found in very coarse grinding wheels to the submicroscopic particles of carbon black. Based on cost, physical properties, and product quality, there is usually an optimum particle size distribution suited to a specific use. In competitive fields, close adherence to this optimum size distribution is vital.

Earlier methods of particle size distribution analysis had limitations and inaccuracies. The Micromerograph combines the good features of the earlier methods with the advantages of modern instrumentation.

Features of sieve analysis, microscopic counting, liquid sedimentation and air elutriation are used in the Micromerograph. A cloud of well dispersed particles is introduced at the top of a pressure tight sedimentation column. Each particle then sediments in still air under the influence of gravity with a terminal velocity which depends on particle size and density.

All particles fall the same distance and are collected on the pan of an automatic recording balance at the bottom of the sedimentation col-

"Calculations of particle size have been incorporated on a template for reading recorder chart directly . . ."

umn. A continuous recording of cumulative weight as a function of time is obtained. This can be converted quickly to a particle size distribution curve by nontechnical personnel.

Dispersion of a powder sample into a cloud of discrete, deagglomerated, yet unbroken, particles is a major requirement of good particle size distribution analysis. Without it, satisfactory results cannot be obtained. All earlier methods of analysis lacked the means of checking quantitatively the state of powder dispersion.

Nitrogen discharges powder

This is accomplished in the Micromerograph by means of a carefully designed powder feed system and deagglomerator. A small pressure chamber, connected to the powder sample chamber by a solenoid valve, is charged with dry nitrogen to a predetermined pressure. When the solenoid valve is actuated, the nitrogen discharges through the powder sample chamber and carries the powder at high velocity through a narrow annular slit in the deagglomerator.

Powder is dispersed by the aerodynamic shear forces in the deagglomerator slit. These forces can be varied within wide limits by the choice of pressure in the pressure chamber and by the choice of the deagglomerator slit width. The former is variable from 0 to 400 psi, and the latter may be adjusted from 10 to 250 microns. In some cases, slit openings to 500 microns are used.

The correct settings for the nitrogen feed pressure and deagglomerator slit width can be determined by making successive partial analyses with steadily increasing deagglomerating forces (higher pressures and smaller slit widths). The cumulative weight curves will move steadily to smaller sizes until complete deagglomeration is obtained.

Information obtained directly

Further increases in deagglomerating force produce no changes in the particle size distribution curve until the force is great enough to break the particles. Analyses are then made at nitrogen feed pressure settings and deagglomerator slit width settings at which complete deagglomeration without breakage occurs.

The cloud of dispersed particles emerges from the deagglomerator at the top of the sedimentation column which is 7 ft 4 in. long and 3¾ in. in diameter. Since the amount of nitrogen introduced with the feed sample is small compared to the volume of the sedimentation column, its effect on the sedimentation medium is negligible. The particles rapidly reach their terminal velocities and sediment the length of the column to the balance pan.

Slight corrections to Stokes' Law take into account the initial distance that the particles travel before attaining their terminal velocities. The entire calculation of particle size corresponding to the time of fall is incorporated into a template which is laid over the recorder chart so that the information can be taken directly from the chart.

Except for the small corrections mentioned, the recorder chart simply expresses the relationship between:

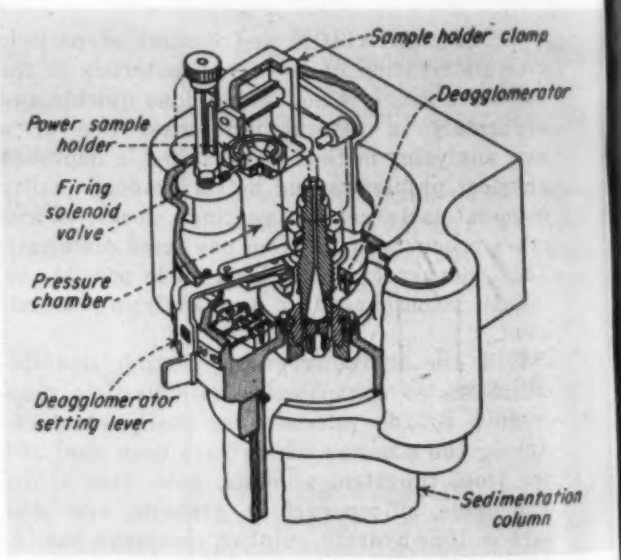
D the particle diameter
ρ the particle density
g the acceleration of gravity
μ the viscosity of the gas
S the settling distance
t the settling time

which is

$$D^2\rho = \frac{18\mu S}{gt}$$

Since the settling distance, acceleration of gravity and viscosity of the gas are kept constant, this equation can be simplified to $D^2\rho = k/t$, where k is a constant. Settling time is measured from the time the initial shock wave of the nitrogen feed blast strikes the pan of the recording balance. Aided by the recorder chart and template, values of accumulated weight of powder on the balance pan corresponding to values of $D\sqrt{\rho}$ of a given size may be obtained directly.

As to the validity of using Stokes' Law when analyzing nonspherical particles, no single parameter other than the volume of a particle



POWDER FEED SYSTEM and deagglomerator disperse powder sample into a cloud of well separated and unbroken particles. Sedimentation takes place in a column more than 7 ft long.

WHERE PARTICLE SIZE DISTRIBUTION IS IMPORTANT

Powder Metallurgy:
Better compacting, higher green strength, and higher density are possible. Small particles provide larger area of surface contact, sinter at lower temperatures.

Ceramics:
Permits more accurate blending of powders within very narrow particle size ranges to give specific properties. Example: Ceramic coating requiring both high heat conductivity and good adherence, each property depending on a narrow particle size range.

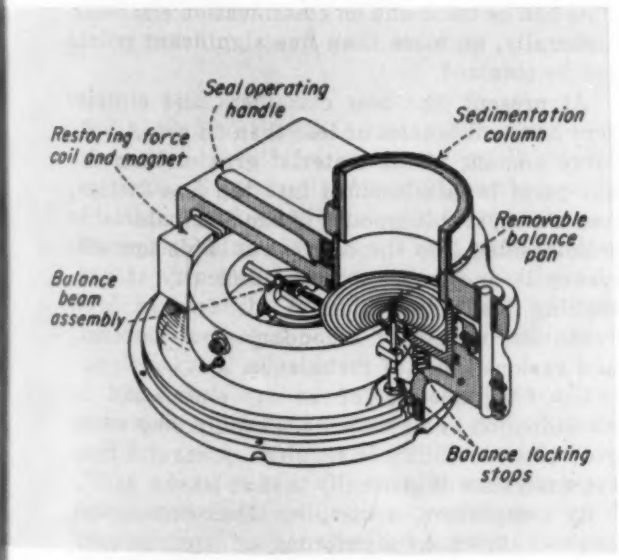
Air Pollution Control:
Gives more accurate data on percentage by weight of fly ash in stack effluents. Large hollow particles with low settling velocities, and small dense particles with high settling velocities are analyzed with equal accuracy.

Abrasives:
Assures better polished surfaces through improved control of particles in very fine size range where a few large particles could affect finish.

Powder Cutting:
Permits improved control of reaction rate and heat developed, both dependent on particle size distribution. Particles too small burn quickly but tend to clog feed lines. Particles too large tend to be deposited out of gas stream.

is an adequate measure of particle size when irregular shapes are involved. In microscopic counting, for example, the same particle measured in different orientations would have different sizes ascribed to it. The Stokes' Law diameter is as good as any and better than many other diameters currently used because during sedimentation the varying orientations of the particles furnish a well-averaged statistical mean diameter.

The automatic balance at the bottom of the sedimentation column is a serve-controlled torsion balance of the null-seeking type. Any slight deflection of the balance beam caused by weight falling on the pan is detected by means of an extremely sensitive balanced differential transformer. The servo loop is such that the calibration of the instrument is independent of possible variations in the electronic circuit.



SERVO-CONTROLLED torsion balance at bottom of sedimentation column is extremely sensi- Weight on pan is recorded automatically. Balance is of the null-seeking type.

The range of the Micromerograph is from 1 to 250 microns, depending somewhat on the density of the material. Since the smallest sieves stop at 44 microns, and become relatively inaccurate below 74 microns, the Micromerograph may be considered as a means of extending sieve analyses to smaller particle sizes.

In the range above 100 microns, sieving is a rather easy and inexpensive technique. Because the Micromerograph and the sieve cover a wide overlapping region, it is simple to perform a sieve analysis down to a sieve size of about 200 mesh and then make a Micromerograph analysis of the particles passing 100 mesh. The overlapping region allows fitting these analyses together smoothly to obtain a composite analysis for any particle size range.

In making such a composite analysis, sieves below 200 mesh should not be used because even on new sieves the errors may be large and the fine wires are subject to damage which cannot be detected easily.

Among the other methods of analysis in the sub-sieve range, microscopic counting is normally considered to be theoretically the most satisfactory. From the practical viewpoint the method is seldom used because it is extremely tedious and requires highly trained personnel. Also, it is too time consuming for most applications.

Careful study of microscopic counting shows that the method is unsatisfactory theoretically as well as practically. The basic difficulty is that of obtaining and counting a sample which is representative of the material involved. At best, a typical microscopic count consists of several thousand particles. In weight, this is considerably less than 1 microgram.

No sampling procedure exists which is capable of obtaining a 1 microgram representative sample from several pounds of material. In fact, there are very few materials in which the particle size distribution is uniform in such micro regions. Also, particle size distribution in an agglomerate weighing perhaps several milli-

grams may be radically different from that of the powder in bulk.

Other difficulties exist in the microscopic methods. One of these is that there is no way of checking quantitatively whether or not dispersion of the material on a slide is satisfactory. In preparing a slide, the very large or the very small particles are easily lost. Also, particles are broken by grinding.

Apart from sampling and slide preparation statistics, there is an unrealistic problem in counting statistics. If, for example, there are equal weights of material between 1 and 2 microns and between 100 and 200 microns in a sample, one million small particles may be found for each large particle.

No statistical problem

Since each large particle has proportionately an extremely large weight, from 10 to 20 of these must be found to obtain a statistically reliable figure for the weight of material in the large particle size range. This necessitates counting from 10 to 20 million small particles. In the Micromerograph, a 100-milligram sample is used so that the statistical problems are easily met with existing techniques.

At first sight, the Micromerograph and some of the better liquid sedimentation methods seem to be basically the same. However, experience with both methods reveals very basic differences. Liquid sedimentation methods cannot determine when the correct state of deagglomeration has been attained. In fact, to obtain any reasonable degree of dispersion is very difficult.

A laboratory may spend several months in determining the surface treatment, wetting agent and a medium to disperse a new material. Moreover, there is no scientific approach to this problem. One is faced with a tedious "cut and try" technique.

The basic requirement for dispersing a powder in a liquid medium is the creation of a pseudo-colloidal state in which like charges are deposited on the particles so that they tend to repel each other. This is a very unstable state which may be altered by extremely small changes in surface treatment of the particles, or by the amounts or types of wetting agents.

Analysis completely automatic

The process of dispersing the powder in the liquid medium also introduces electrical forces between the particles which are comparable with the sedimenting forces. Since these forces are not well understood, the calculations of liquid sedimentation simply ignore them. This difficulty in obtaining adequate dispersions in liquid mediums is the major disadvantage of liquid sedimentation as compared to the Micromerograph which uses controlled dispersion.

The ratio of the sample size to the volume of the sedimentation column in the Micromerograph can be made much larger than that of the liquid sedimentation methods. This makes it possible to reduce the displacement flow velocities of the medium, caused by sedimenting particles, to negligible values. Liquid sedimentation methods require that the medium be agitated when readings are taken. This is avoided in the Micromerograph by the use of a servo-controlled balance pan whose motion under full load is less than 0.0001 in.

One of the greatest practical advantages of the Micromerograph is its completely automatic nature. Analysis is almost completely independent of the operator. Consequently, highly trained operating personnel are not required and most human errors eliminated.

Difference between methods

The main difference between air classification and elutriation methods and the Micromerograph is one of instrumental techniques. The exception is that in air elutriation again no method exists for determining when the correct state of deagglomeration has been attained. Since the powder is recirculated repeatedly through a feed device, it is extremely difficult to obtain proper deagglomeration of the very fine particles without seriously grinding the large particles.

In air classifiers and air elutriators, the number of significant points which can be obtained in determining the particle size distribution of a powder depends on the sharpness with which cuts can be made and on classification efficiency. Generally, no more than five significant points can be obtained.

At present, the best classifiers and elutriators have efficiencies of less than 50 pct. A very large amount of the material greater than the cut point is misclassified into the fine faction, and a comparable amount of the fine material is misclassified into the coarse cut. This low efficiency is due to the extreme difficulty of controlling the distribution of air flow at high velocities, undesired secondary flow patterns, and various types of turbulence.

The time needed for an air elutriation or classification analysis is undesirably long when good reproducibility is required. A careful five-cut analysis will generally take at least a day.

By comparison, a complete Micromerograph analysis down to 3 microns on iron powder requires 20 minutes, and an analysis down to 1 micron takes 2¾ hours. Also, the time required in sample preparation, cleaning and setting the Micromerograph, and computing the final curve is only 15 minutes.

Alloying ingredients in flux—

New Developments Teamed Up To Make High-Quality, Low-Cost Hard Surfacing Deposits

By L. K. Stringham
Chief Engineer
The Lincoln Electric Co.
Cleveland

◆ Three developments combined into one process have been teamed up to produce hard surfacing deposits of high quality at low cost . . . Feeding two carbon steel electrodes through a submerged arc welding head simultaneously permits a high rate of deposition.

◆ Alloying of the deposited material is accomplished by use of an agglomerated flux—one containing proper proportions of alloying ingredients and flux, and ground to the correct particle size.

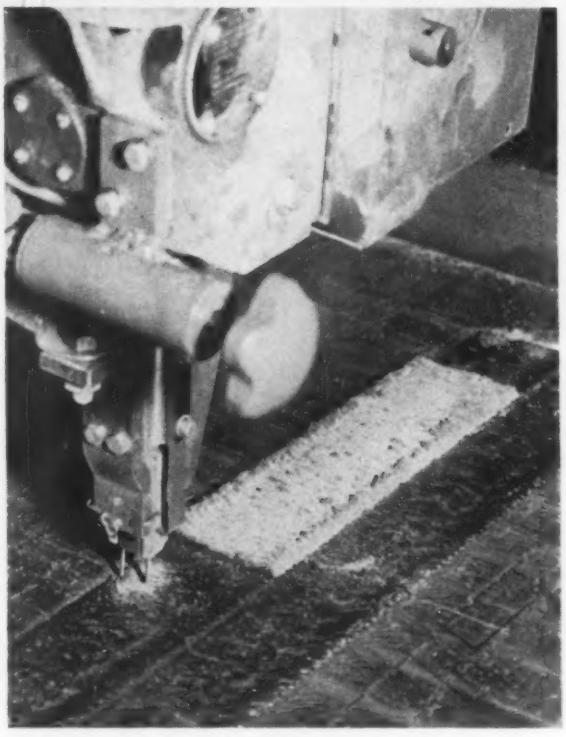
◆ To obtain wide, shallow passes, the welding head is oscillated by a special attachment . . . Costs for rebuilding worn parts as well as hard surfacing new equipment have been cut sharply.

◆ HARD SURFACING, once used almost entirely for rebuilding worn parts, is rapidly becoming a production tool. The main reasons for this trend are the recent developments in automatic hard surfacing. Three such developments stand out—equipment for oscillating a welding head, a simpler method for adapting heads for multiple arc welding, and use of agglomerated alloy fluxes.

These developments combined with the advantages of submerged arc welding work hand in hand to produce high-quality, low-cost deposits. They are used both for rebuilding worn equipment and for applying hard surfaces on new equipment which is equal or superior to equipment which had been hard surfaced or fabricated by other methods.

The process uses a submerged arc welding head, solid carbon steel electrode and an agglomerated flux which contains the desired hard surfacing alloys. Substantial quantities of the essential alloys in the flux are satisfactorily transferred to the weld deposit.

Agglomeration of the flux is achieved by mixing the properly formulated, finely-ground particles together with a proper binder and drying the agglomerate. The resultant product consists of particles or grains which, because they are too large for submerged arc welding, are ground to the proper size.



SUBMERGED ARC welding head has been adapted for oscillation and twin wire feeding. Wide deposits are made in a single pass.

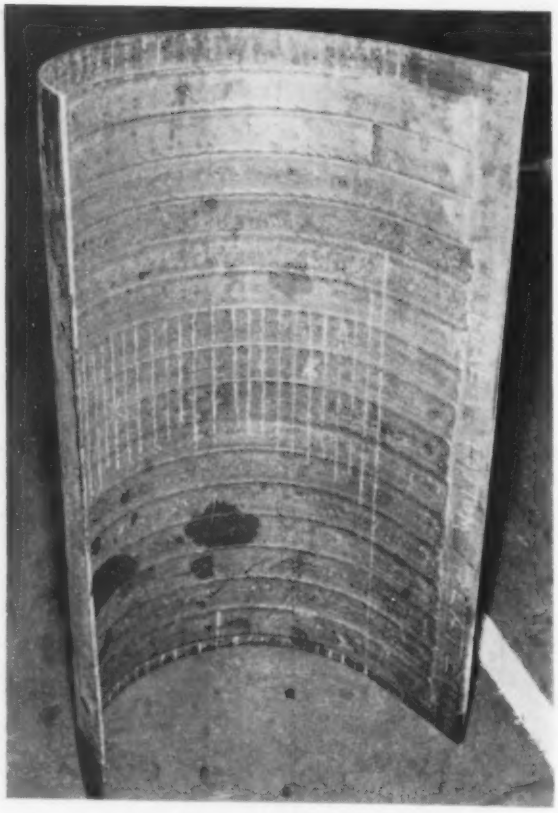
"Agglomerated fluxes are the most important factor of this hard-surfacing process . . . "

Each grain consists of hundreds of tiny particles of fluxing and alloying materials bonded together so they cannot separate in shipment or use. Chemically, all grains are alike.

Without agglomeration, the alloy being heavier than the fluxing material would settle out and uniform deposits would be difficult to obtain. Thus, agglomerated fluxes are the heart of this hard-surfacing process.

The oscillating and multiple arc adaptations for automatic heads are equipment developments which materially reduce the cost of surfacing. The multiple arc adaptation, called Twinarc, is simply an attachment for a submerged arc head which permits simultaneous feeding of two electrodes, normally placed side by side, through one head. This reduces surfacing costs because with two wires the rate of deposition can be substantially increased over that of a single electrode without increasing penetration. Penetration is undesirable in hard surfacing because the base metal dilutes the alloy deposit.

The oscillating device, called Spreadarc, is another attachment for a standard submerged arc head. This attachment provides a means of producing a surfacing layer of metal more than 3 in. wide with one pass.



BOTTOM LINER for mixer was completely surfaced in 16 passes by submerged arc welding. Its cost was a fraction of manganese steel liner.

BUCKET TEETH for power shovels are hard surfaced in a single pass. The hard, uniform and smooth deposits are 3 in. and more wide.

From a deposit composition standpoint, the process is at present commercially applicable for depositing machinable ferritic deposits and nonmachinable, but forgeable, semiaustenitic deposits. It is not recommended for high tungsten and chromium carbide deposits, or austenitic manganese deposits.

In many cases, abrasion resistance can be obtained with forgeable semiaustenitic submerged arc deposits which are comparable to or better than those obtained with manual arc electrodes which supposedly produce nonforgeable chromium carbide deposits. Theoretically, this should not be so. Practically, it is because the submerged arc deposit is more uniform chemically and smoother physically than a chromium carbide hand deposit.

Flat and roundabout parts

Submerged arc hard surfacing is applicable to flat and roundabout parts. For roundabout deposits, it is applied to parts as small as 4 in. in diameter. On flat surfaces, it is applied to parts requiring a surface length as short as 3 in.

The cost of hard surfacing by this process is generally about one-fifth that of surfacing by hand welding to obtain the same wear resistance. In hand welding, wear resistance is often sacrificed, in which case its cost would be cut in half but would be about two and a half times as much as by automatic submerged arc welding. This cost is for forgeable but nonmachinable semiaustenitic deposits which are most commonly applied by both automatic and manual hard surfacing.

One application is that of hard surfacing a mixer bottom liner which was made originally from 12-pct manganese steel. Due to difficulty in obtaining and cutting this ⅜-in. thick mate-

rial to required size, then welding it into a watertight bottom, the manganese steel plates were replaced by SAE 1015 plates which were hard surfaced by hand. Subsequently, automatic submerged arc welding was used.

The hand surfaced liner cost 50 to 60 pct more than the manganese steel plate. However, it was actually cheaper since it lasted twice as long. The liner which was hard surfaced automatically cost 50 to 60 pct as much as the manganese steel liner and lasted more than twice as long. Based on its service life, the automatically surfaced plate will cost from 25 to 30 pct as much as either the manganese steel liner or hand surfaced liner.

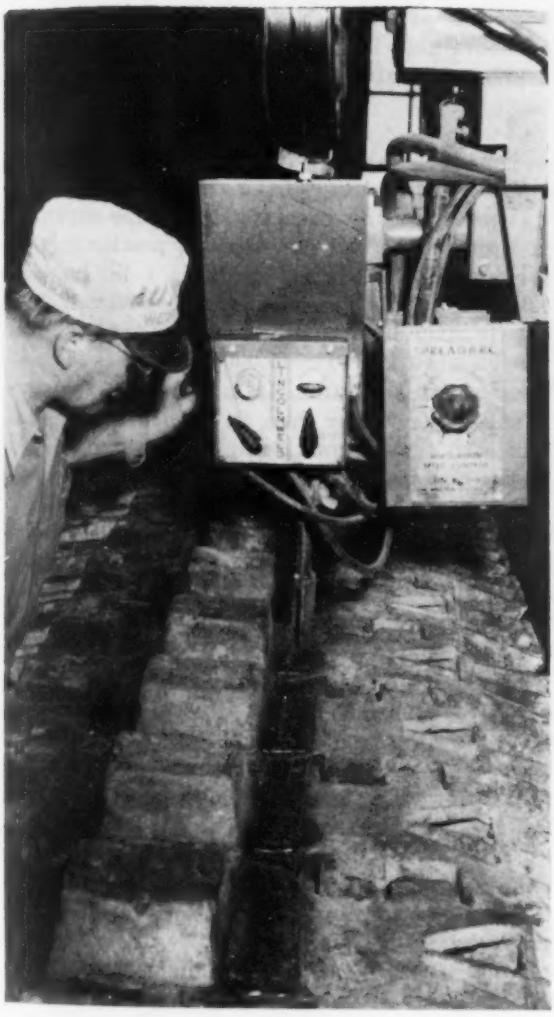
Extend scraper blade life

Scraper blades are also being hard surfaced by the automatic submerged arc process. The cost per blade is less than 60 pct the cost for hard surfacing by hand. In service under comparable conditions, the hand surfaced blade lasted 4 weeks whereas the automatically surfaced blade lasted 12 weeks. Considering cost of application and service life, cost of the automatically welded blade is a small fraction of that of the hand welded blade.

Keep molten puddle small

On roundabout seams, at least in smaller diameters, just a single electrode and no oscillation is used. In such applications, this is necessary to keep the molten puddle small so that it can set and not run off. Rolls with a concave or convex surface can be hard surfaced just as easily as those with straight surfaces.

Although the process is relatively new, it is being used for a great many applications. Bucket teeth, extruder rams, mixer shafts, tracks, rollers, idlers and crusher cones are only a few of the items which are being hard surfaced by automatic submerged arc welding in conjunction with the use of an agglomerated flux containing the desired hard surfacing materials. Lower cost applications, once thought too expensive, are now being further developed.



BUILDING UP pads on shovel tracks is an example of production hard surfacing. Process is also used for extruder rams, idlers, crusher cones, rollers and many other items.

DEPOSITS on round surfaces are applied just as easily as on flat surfaces. On small diameters, a single electrode is often used to keep the molten puddle small and prevent runoff.

Extends bearing service—

Test Gives Bond Life Expectancy of Bimetallic Materials

By J. B. Mohler Consultant, New Castle, Pa.

◆ Service life of some bimetallic sleeve bearing materials can be estimated, particularly where time and temperature are among the operating factors . . . Measurements of bond strength after heating the clad material for various times at various temperatures gives the progress of bond deterioration . . . Bond life is estimated by extrapolation.

◆ Bearings of aluminum on steel made to conform to the test findings have been in Diesel engine service for 4 years without failure due to bond deterioration . . . Use of this test method greatly accelerates testing time.

◆ DETERIORATION of the bond between the layers of some bimetallic materials can severely limit their service life under certain operating conditions. This is particularly so on some bimetallic sleeve bearing materials where time, temperature, speed and load are operating factors. As a precaution against this type of failure, tests have been devised to determine and lengthen the life expectancy of these materials.[1]

How long will it take for the bond to deteriorate under operating conditions? A thick layer of tin on an aluminum bearing alloy has a bond life of 200 to 400 hours at 300°F when these two layers are separated by a layer of copper 0.0002 in. thick.[2] If the copper layer is thinner, bond life will be shorter. Without the copper layer, bond life will not be satisfactory.

In the early development of aluminum clad steel bearings, the aluminum layer could be lifted from the steel if the stock was heated for 2 hours at 1000°F.[3] This showed that bond deterioration occurred below the melting point of the aluminum and that it could be complete.

At 300°F, the bond remained good for many hundreds of hours. Nevertheless, in thousands of hours deterioration was evident and it was decided to evaluate bond life on a quantitative basis.

Accelerated bearing tests

The bond strength of the aluminum clad steel was measured by checking the shear strength of a specimen. This consisted of machining the specimen to isolate a bond area 1 in. long by 0.050 in. wide, then pulling the specimen in a tensile machine. Shear strength of the material was between 10,000 to 11,000 psi by this test. At these shear strengths, failure was in the aluminum layer rather than at the bond line. This indicated that a good bond had been obtained by the cladding method.

Bearings of this material were successfully run on an accelerated bearing test with shear strengths of 3000 to 7000 psi. It was then assumed that the time for the aluminum clad steel to deteriorate to 5000 psi could be used as a measure of safe bond life.

Specimens of aluminum on steel stock were heated for various times at various temperatures, and the bond strengths were determined by the shear test. The progress of bond deterioration with time was readily demonstrated. It was also noted that the rate of deterioration was markedly increased with an increase in temperature.

Very long heating times at low temperatures are required to estimate bond life under service conditions. For this reason, bond life was estimated by extrapolation. Points were made on a graph to represent the times necessary for the bond to deteriorate to 5000 psi or about 50 pct of the original shear strength. At this shear strength, the two metals still had good adherence as determined by a chisel test.

MR. MOHLER, former Director of Research of the Johnson Bronze Co., and now an industry consultant, has wide experience in all phases of metalworking.

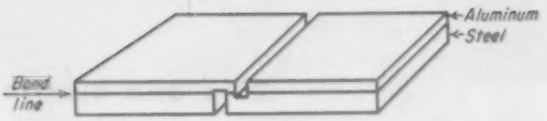
Bearing temperatures during operation are not known. However, estimates can be made from the oil temperature, and by comparing the appearance of bearings removed from service with bearings run in a test machine at known temperatures. Also, bearing temperature is lower at the bond line than at the bearing surface. It will also depend on the power extracted from the engine.

A temperature of 240°F was considered a safe average running temperature. By extrapolation, a bond life of 10,000 hours was estimated. This exceeds the expected service life of bearings in heavy-duty Diesel engines.

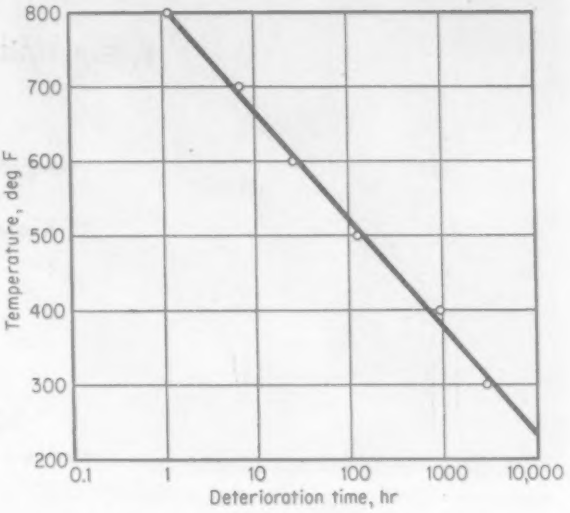
For large engines in continuous duty, this is not a long life, but bearing temperatures are much lower in such applications. Bearing temperatures in large internal combustion engines probably run below 150°F so that a bond life of 100,000 hours may be expected.

Bond Deterioration of Aluminum on Steel Specimens

Temperature, °F	Time, hr	Shear strength, psi
as clad	...	10,600
as clad	...	10,500
as clad	...	9,800
as clad	...	9,800
as clad	...	11,500
as clad	...	10,400
300	168	11,200
300	420	9,600
300	625	8,900
300	960	10,100
300	1,320	8,100
400	100	9,900
400	260	9,400
400	432	6,800
400	700	7,400
500	19	9,400
500	26	8,900
500	48	8,600
500	72	5,100
500	90	4,900
500	120	6,500
600	2	8,000
600	17	5,500
600	18	6,300
600	22	6,300
700	1	9,400
700	2	8,100
700	3	5,000
700	4	5,800
700	6	3,900
700	8	3,900
800	½	8,000
800	1	6,000
800	1½	5,000
800	2	4,000



SPECIMENS for measuring bond strength isolate a bond area 1 in. long by 0.050 in. wide. The specimen is then pulled in a tensile machine.



TESTING for bond life under service conditions would require long heating times at low temperatures. Therefore, estimated life of sleeve bearings is determined by extrapolation.

Bearings made to conform with the findings of this investigation have now been in Diesel engine service for 4 years. Some have been replaced, but only because of normal wear. Failures due to bond deterioration have not been found in service. Their absence substantiates the conclusions drawn from the investigation and establishes a safe reference point for measuring bond deterioration as it applies to sleeve bearings.

The data are also useful for manufacturing purposes. If, for example, it becomes necessary to anneal the aluminum prior to a forming operation, a safe annealing time and temperature can be taken from the graph. Deterioration in an annealing time of 1 hour at 500°F would be negligible. However, annealing at 800°F would result in a large decrease in bond life.

REFERENCES

[1] I. C. Sleight and L. W. Sink, Sleeve Bearing Materials, ASM, Cleveland, 1949, p. 67.
[2] British Patent No. 702,188.
[3] U. S. Patent Nos. 2,539,246-8.

ACKNOWLEDGEMENT

The author acknowledges his indebtedness to the Johnson Bronze Co. for permission to use this data.

Zinc and aluminum—

New Die Casting Plant Features Melting, Handling Economies

By G. B. Nyselius, President, Mt. Vernon Die Casting Corp., Stamford, Conn.

◆ Low frequency induction furnaces keep dross down, temperatures under close control in melting zinc and aluminum alloys . . . For zinc die casting, molten metal flows in heated "launders" between melting and holding furnaces . . . Gravity flow serves 10 casting machines with no mechanical handling.

◆ Bucket conveyors carry castings to cleaning rooms, return gates and sprues to melting furnaces . . . Trip levers automatically dump scrap into furnace charging chutes . . . Separate conveyors and processing departments for zinc and aluminum prevent metal mixups.

◆ A HIGHLY EFFICIENT, virtually continuous cycle for production of zinc and aluminum die castings is now in operation at Mt. Vernon Die Casting Corp.'s new plant in Stamford, Conn.

Design of the plant includes several noteworthy features for economy, safety and high quality volume production. With a few minor exceptions, low frequency induction furnaces have replaced gas-fired types for melting and holding. And continuous bucket conveyors handle all castings, gates and sprues in serving the melting, casting and cleaning departments.

Due to the efficient integration of induction furnaces and conveyors, only two men are needed for supplying molten metal to all the firm's zinc and aluminum die casting machines.

In a 10-machine zinc die casting setup molten zinc is transferred from melting furnaces to the holding furnaces by gravity flow through heated, insulated trough-like runways, or "launders." There is no mechanical transfer of zinc alloy in the cycle from melting to casting. Preliminary handling is limited to the transfer, by fork truck, of high purity materials from storage to the melting furnaces. These zinc slabs and alloying elements are hand charged.

About half the zinc alloy melt consists of sprues and gates. These are returned from casting cleaning areas in chain conveyor buckets that dump automatically into furnace charging chutes.

Two Ajax 60-kw induction furnaces are used for zinc melting. Each furnace holds 2000 lb of metal and always has a molten heel of 300 to 400 lb. Alternate charging and melting cycles maintain a constant supply of molten alloy. An electric chain hoist tilts the furnaces to pour the metal into the end reservoir of the "launder" system. Dross is skimmed before pouring and a small amount is skimmed from the reservoir if necessary. Since drossing is negligible, no fluxing is required.

As shown in the accompanying diagram, each of the five induction-heated holding furnaces serves two die casting machines. Molten zinc flows by gravity from the launder reservoir into the troughs which link the holding furnace stations. Each launder section has a resistance-heated cover and a refractory lining which also serves as a good heat insulator. Power to each launder cover is regulated to keep the molten alloy at required casting temperature.

Compensate for radiation losses

Molten zinc alloy in all holding furnaces and launder sections remains at the same level. This level is held within a two-in. variation by adding new metal from one of the melting furnaces. At no time is the zinc alloy ladled or transported since it simply flows from end to end of the casting machine line.

Heat induced in the holding furnaces causes the alloy to circulate through the furnace channels. Automatic temperature controls regulate the heat added in these channels to compensate for radiation losses and to keep the metal at casting temperature. Working conditions near the furnaces are excellent because the refrac-

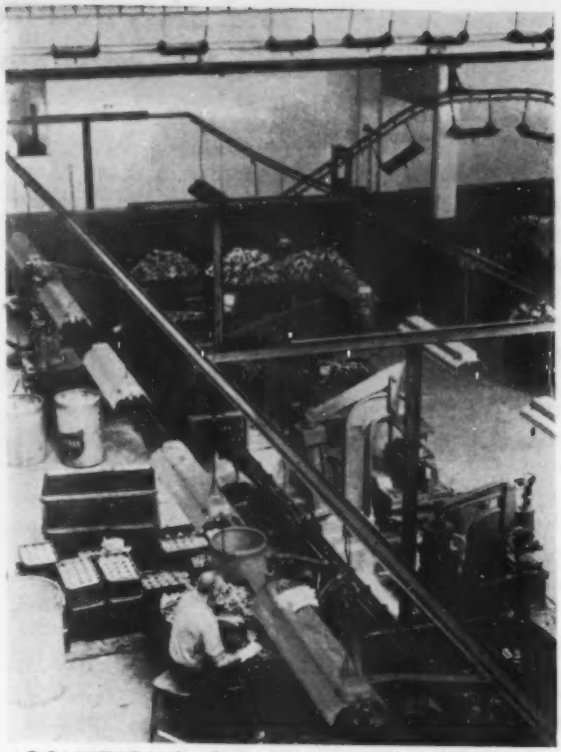
tory linings are good insulators and each furnace remains covered.

None of the paired die casting machines has any positive connection to its holding furnace. Each so-called "gooseneck," with its hydraulic plunger, is supported by a bridge over the furnace. The gooseneck is merely submerged in the molten zinc alloy and does not touch the furnace wall. This protects holding furnaces against shocks and vibration, but permits normal machine operation.

Because the company die casts more aluminum than zinc, metal melting and handling differ considerably for the two metals. Aluminum is melted in two low frequency Ajax furnaces, each of 200 kw capacity. These have replaced former reverbatory furnaces and have proven much more convenient and controllable. They produce no smoke or fume except when fluxing is required.

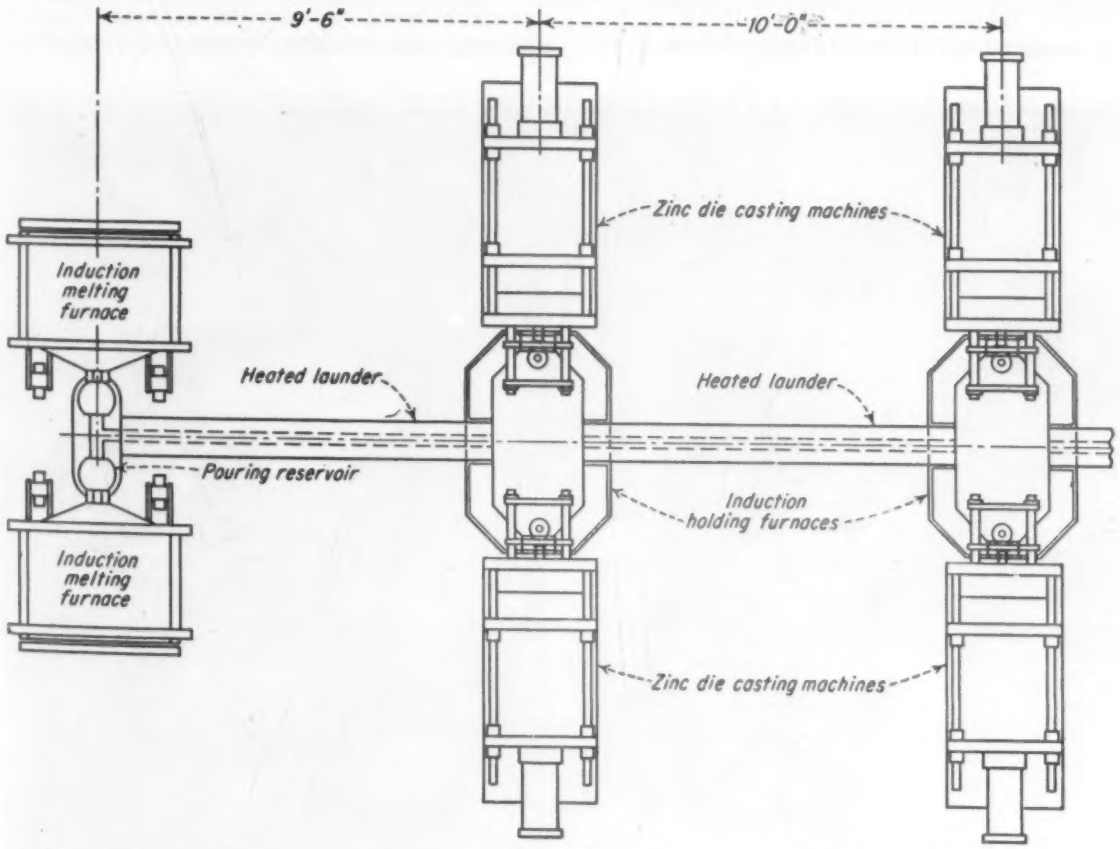
These induction furnaces radiate comparatively little heat, maintain and control metal temperature within five degrees, seldom need relining and have no iron surfaces to contaminate the melt. Furnace lining life is about two years for the hearth, and averages eight to nine months for the lining of the inductor units.

The aluminum melting furnaces hold about 4000 lb each. A heel of 1100 lb is the minimum allowed before recharging. Chutes behind each furnace receive sprues and gates from the bucket conveyor, and are discharged into the furnaces by tripping a tilt bar.



CONVEYOR buckets bring castings to power press trimming area, return scrap for remelting.

Heating in these induction melting and hold-



TWO MELTING furnaces continuously supply molten zinc to five holding furnaces and ten die casting machines through a system of "launder" troughs. Drawing shows part of the setup.

"Total dross from the melting furnaces is about one-third the amount formerly produced by reverberatory melting . . ."

ing furnaces occurs in channels below the hearth. Metal circulates rapidly in these channels but there is some tendency toward clogging if the metal contains dross. A bar is used occasionally to clean the vertical channels. Chlorination reduces the tendency toward dross formation. In general, chlorination once or twice a week is ample.

For pouring molten aluminum into ladles for transfer to holding furnaces, each melting furnace nose-tilts hydraulically by means of two cylinders. Melting furnaces are located in pits with working platforms slightly above floor level. Tilting controls are placed between the two melting furnaces where an operator can observe the ladle filling operation.

Closed conveyor circuits

Total dross from the melting furnaces is about one-third the amount formerly produced by reverbatory melting. Dross is skimmed before metal is poured into the bull ladle, and again before the ladles are emptied into the holding furnaces.

The 500-lb capacity bull ladle is supported on a trunnion frame attached to a lift truck. When the ladle is filled and skimmed, the truck carries it to a holding furnace where the ladle is elevated and hydraulically tilted by controls at the truck operator's seat. Ladle lining is the same as that used in the induction furnaces to prevent iron pickup. When not in use, the ladle interior is kept hot by a gas flame.

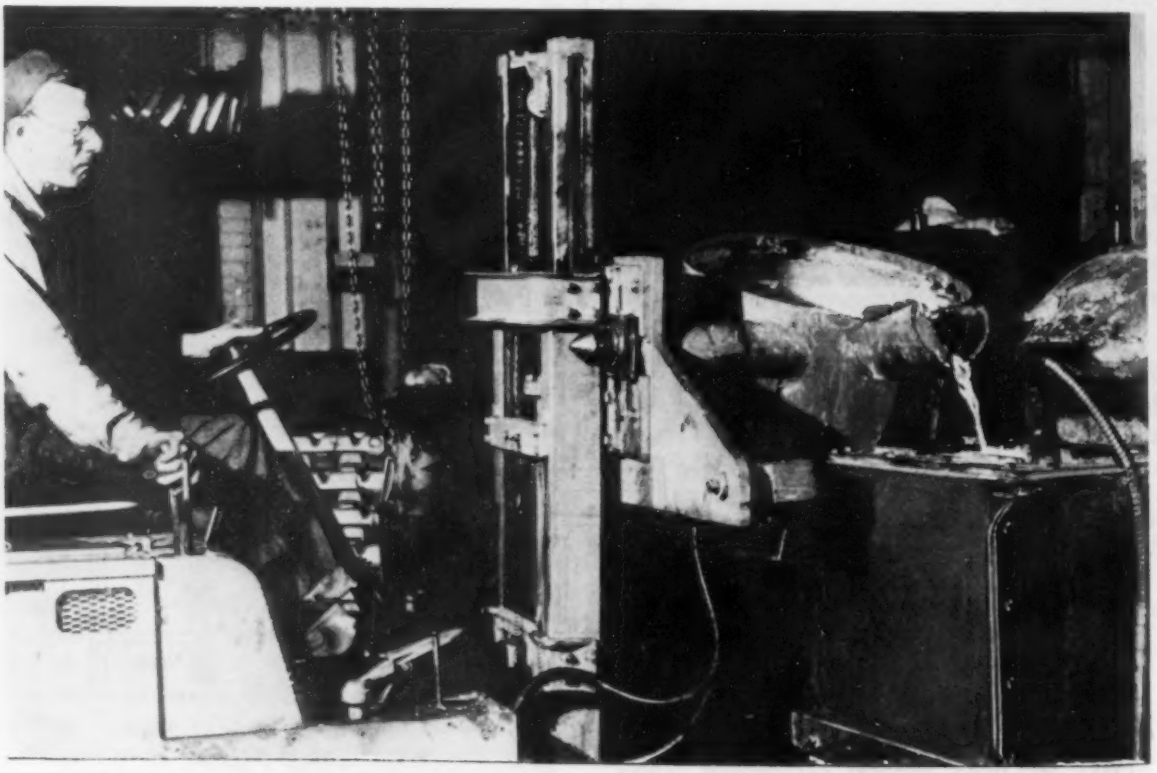
Of the eight induction heated aluminum holding furnaces, seven are 20-kw capacity, and one is a 35-kw type. The 35-kw furnace is sometimes used for both melting and holding special alloy material.

All pyrometric controls, including indicating and recording instruments, are panel-mounted at one end of the aluminum furnace and casting machine area.

Nearly all of the firm's aluminum die castings are produced in cold chamber machines, with molten metal forced into the dies by a positive plunger under hydraulic pressure. A few "gooseneck" machines, operated by compressed air, are still kept in service for old short run dies not adaptable to cold chamber machines. No new dies for these machines have been built in the past six years.

To prevent the possibility of metal mixups, effective separation of zinc and aluminum material is achieved with separate casting, cleaning and conveyor setups.

One bucket conveyor line makes a closed circuit past all zinc furnaces, die casting machines, and trimming equipment. A similar closed circuit conveyor serves the aluminum casting and cleaning departments. Although the two conveyors run parallel at some locations, loading and unloading points are located only



ALUMINUM transfer to holding furnace. Ladle lift and tilt are controlled from driver's seat.

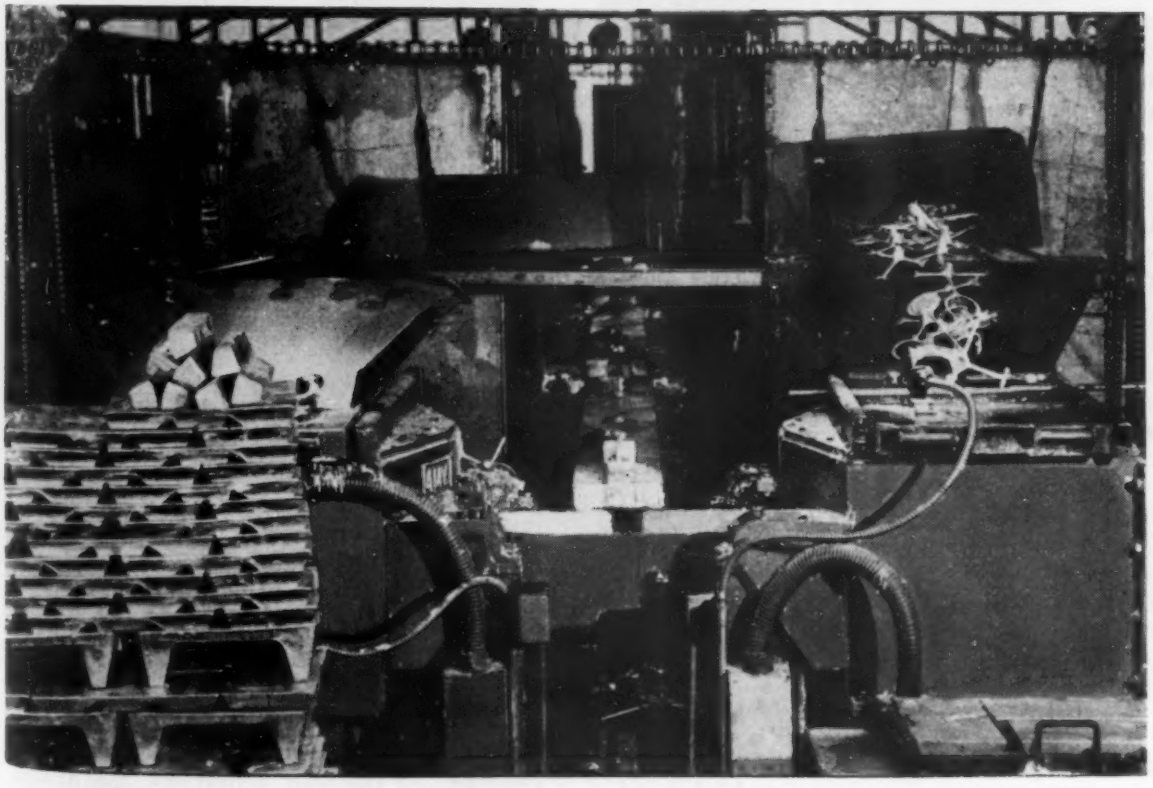
where the proper type of alloy can be put on or taken off the conveyors.

As zinc or aluminum castings are produced, casting machine operators remove them from the machines by hand. Each gate of castings is placed on an adjacent metal bench. In some cases, the sprue is broken off at this bench and dropped, with the castings, into a passing conveyor bucket. Or the entire gate, including the sprue, is placed in the bucket without separating the castings. Conveyor buckets proceed slowly toward the cleaning area.

In the cleaning departments, gates, sprues and runners are broken or sheared off and returned for remelting. Castings requiring additional machining are moved along in tote boxes or shop trucks.

Although there are separate areas for machining zinc and aluminum castings, conveyors do not serve these locations; most of the metal to be remelted has already been conveyed to the furnaces from previous trimming stations.

ALUMINUM scrap for remelting is dumped from conveyor buckets into tilting chutes at furnaces.



HEATED "launder" between twin zinc-melting furnaces supplies metal to casting machines.

Forming and fitting—

High Speed Techniques Extend Applications of Rotary and Press Swaging

◆ Use of rotary and press type swaging machines keeps growing as equipment becomes faster, more efficient . . . New rotary swagers make it easy to reduce tubing diameter in the center while leaving the ends untouched . . . Or they'll point the same tube ends to a watertight fit at mass production rates.

◆ Hopper feed and induction heating units simplify hot rotary swaging of headed steel blanks . . . Fast press swaging produces calking gun tips from steel tubing 800 pct faster than the old forming method . . . Index tables on small vibrating-ram presses speed manufacture of tiny watch parts and ball point pens.

By J. E. Hyler
Consultant
John E. Hyler & Associates
Peoria, Ill

◆ APPLICATIONS of the swaging technique for metal forming and assembly are steadily increasing due to new developments in rotary and press type swaging machines. Improved die designs and use of automatic feeding and indexing devices are boosting high volume, low cost production of swaged parts while requiring less operator skill.

Rotary swaging has usually been limited to reducing the diameter of material for its full length, or for reducing one or both ends of workpieces. As a rule, it was not considered feasible to reduce solid rounds or tubing at any point toward mid-length, while both ends were left original size. Whenever such work was done, it meant removing a die before inserting the work, replacing the die for actual swaging, and finally removing the die again to withdraw the finished work.

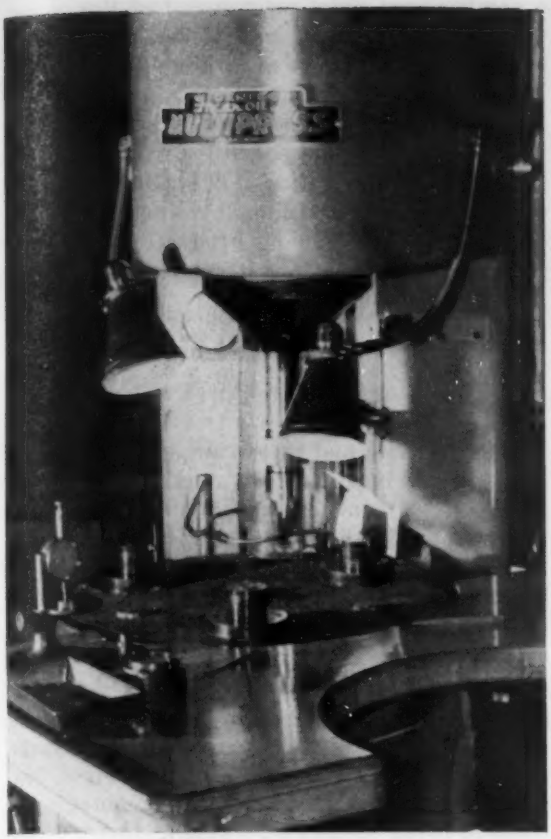
But newly developed high production machines now permit swaging material to a smaller diameter in the center than at the ends. A wedge action spreads the die halves to pass the larger work diameters without interference. One such machine uses hydraulic pressure to operate the wedge mechanism.

MR. HYLER'S background as a consultant and author includes more than 20 years' experience in all phases of shop work. His studies of diversified metalworking operations have been reported in numerous Iron Age technical articles.

This type of rotary machine makes possible such applications as swaging ball fittings on cable and swaging tubing over ball ends, as well as step swaging and internal reduction. Wedges are located between the hammer blocks and swaging dies. When the wedges are fully advanced, they close the dies in the normal manner. When the wedges are retracted, centrifugal force and spring action cause the dies to open for insertion of a ball or other larger diameter.

One interesting auxiliary device for rotary swaging is an automatic hopper feed, incorporating induction heating. The feed unit cuts time and labor costs substantially on hot swaging of some short parts. In one application, headed steel blanks, 9/16 in. in diam. and 4 1/16 in. long under the head, are hot-pointed to a length of 5 7/16 in. under the head. The tapered section is 3 1/16 in. long.

Workpieces automatically feed from the hopper into a vertical tube where each piece is heated to 2000°F in 1½ seconds. The heated part drops from the tube into a delivery chute where it is picked up by loading forks and placed in a universal chuck. Loading time is 1½ seconds. The chucked piece is fed into the machine, where 2 seconds are required for swaging. As the feed withdraws, the finished piece drops directly into a quench tank.



TINY watch parts are loaded, swaged and air-ejected on indexing table. Rate: 7000 daily.

Production is slightly more than 500 finished pieces per hour. This is an increase of 300 pct over conventional screw machine finishing.

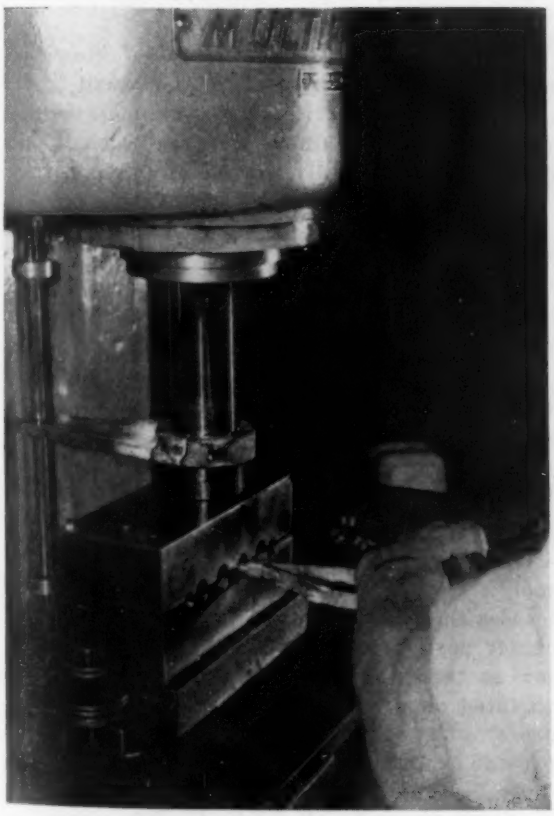
Added advantages with the hopper feed and induction heating unit are substantial savings of material, smooth finish of the swaged section, increased part toughness, and improved grain structure. No operator attention is required except to fill the hopper.

Short ram strokes form tip

One recent rotary swaging development uses a roller to form a retaining lip on an outer bearing race. The work can be done on different types of lathes, or on vertical or horizontal boring mills. A groove is machined in the race and the lip is roller swaged over a chamfer.

In modern press swaging, some applications require rapid vibratory action in the press ram. One such operation swages ½-in. diam steel tube to form calking gun tips with tapered-end openings ⅛ in., ¼ in. or ⅜ in. in size. A special two-piece swaging die has roughing and finishing cavities for the different gun-tip sizes. Both parts of the die are mounted on the press bed so that neither die section has any direct connection with the ram.

In forming a tip, an operator uses special inside pliers to rotate and feed a short length of steel tube into the proper die cavities. Compression springs hold the die halves open as the



PRESS swaging calking gun tips of various sizes in a multi-cavity die speeded output 800 pct.

WATCH mechanism blanks to be press swaged are tweezer-loaded on this index table fixture.

"Solenoid-operated impact tools are often used for delicate swaging of small parts . . ."

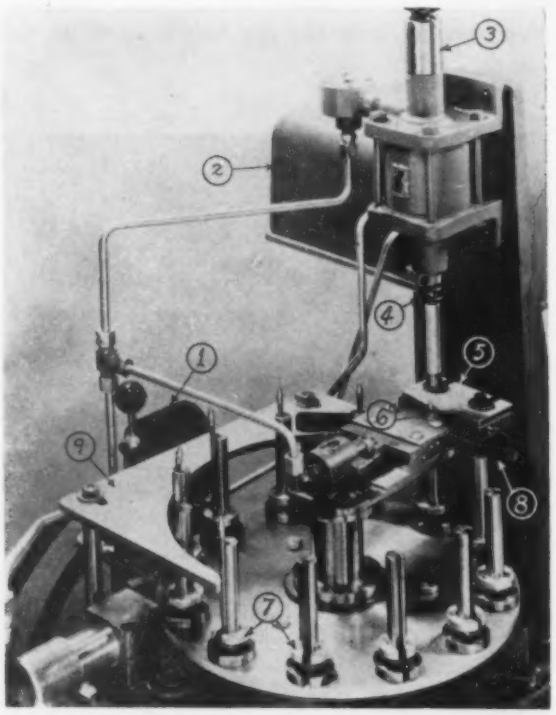
work is inserted. The die also opens slightly between each ram stroke.

The operator judges progress of the work by touch. In switching from one calking-tip size to another, the operator simply uses the correct die cavities after first moving the die right or left on the press bed, so that work is done directly under the ram. This arrangement eliminates the amount of down time required for changing dies.

The press ram delivers multiple strokes of uniform, pre-set pressure when the operator holds a foot pedal in lockdown position. The short vibrating ram strokes form the tip with virtually a continuous flow of metal.

Each tip is swaged in about 24 sec. Output rate is 1200 calking gun tips per day, which is an 800 pct increase over production obtained by a former method.

In another high-precision swaging operation, an 8 ton press with a 6 station index table forms a small raised point on one end of tiny pallet fork blanks, used in watch mechanisms. The swaged points must be accurate within 0.002 in. in height and within 0.004 in. in diam. The index table features a skip-station acccessory control. Dies are mounted in special fixtures at three of the six indexing stations. The skip-station device allows the remaining three positions to be by-passed without losing production time. The press is adjusted so that it can deliver as much as a 4-ton ram effort.



SPECIAL press swages steel balls into brass noses of ball point pen tubes at a rate of 3600 per hour. Machine features are (1) master air valve, (2) timer, (3) controlled-stroke air cylinder, (4) pressure-equalizing spring, (5) stationary jaw, (6) floating jaw, (7) adjustable-height work supports, (8) ejector spring, (9) work-positioning guide. Pen tubes are loaded at front of table, rotate clockwise for swaging and ejection.

Table and press feeds vary

The operator is only required to load the dies and gage the swaged parts to check tolerances. The index table and press ram speeds are variable, and are independently regulated until they are perfectly synchronized. While the operator loads a part in the fixture nearest the front of the index table, the press ram descends to close the dies and swage a part on the opposite side of the table. The operator's hands are always in safe position.

Variation in part height on this operation does not affect finished accuracy because the press delivers a precise amount of pressure with every stroke, regardless of part height. The part gradually conforms to the die contours instead of being formed by a single impact. After the part is swaged, the loaded fixture indexes to the next position where an air jet ejects the part into a box. Although blanks are so tiny they must be placed on the fixtures with tweezers, the production rate on this operation runs as high as 7000 per day.

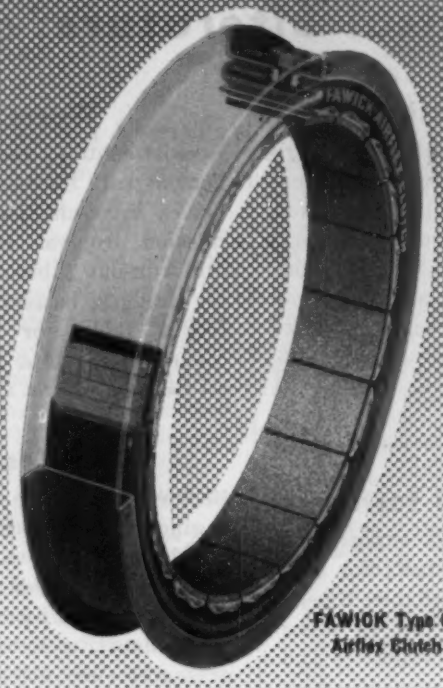
Solenoid-operated impact tools are often used for delicate pressure swaging of small parts. Although these electric impact hammers are not true swaging machines, they are efficient and fast for very small work. Many hypodermic needle manufacturers use various types of solenoid-operated impact tools for swaging needles to their hubs.

Special machines are air-powered

Special machines built up from more or less standard parts are often devised to swage small, delicate work. Such machines use pneumatic power extensively. One unit uses an indexing table to swage steel balls into the brass tubes of ball-point pens at a rate of approximately 3600 per hour.

To insure perfect register with the swaging tool, a stationary jaw at the swaging position locates the work. A floating jaw, mounted on a center post, holds each piece in its stationary jaw as the swaging tool descends. The tool is mounted on a spring-loaded sleeve on a small press ram. Locknuts on the top end of the ram provide positive stroke control. Tool pressure on the work is uniform regardless of the amount of air pressure used in the cylinder. The pen tube is gripped by the neck, just below the shoulder, to assure correct height.

FAWICK AIRFLEX



FAWICK Type CB
Airflex Clutch

FAWICK Type E
Air-Ring Brake

EXECUTIVE REMINDER:

Investigate the advantages of Fawick Clutches for all your industrial equipment

No single component on modern machines can contribute so many advantages to overall efficiency as the clutch unit.

FAWICK AIRFLEX CLUTCHES AND BRAKES provide *all* the advantages made possible by drum type operation and air actuation.

Among these are (1) more effective power transmission through application of clutch pressure at maximum diameter; (2) smooth performance through absorption of load and operating shocks; (3) unmatched low maintenance through elimination of wear adjustment or lubrication.

You are cordially invited to use the outstanding FAWICK ENGINEERING SERVICE to investigate the advantages of FAWICK AIRFLEX CLUTCHES AND BRAKES as applied to your production equipment.

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For further information on Fawick Industrial Clutch and Brake Units, write to the Main Office, Cleveland, Ohio for Bulletin 400-A.

FAWICK Airflex
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Technical Literature: Catalogues

Fabric dust arrester

Amerjet fabric arrester is a high efficiency dust collector that incorporates the same basic concept and design features found in all AAF dust control products. Folder illustrates with pictures and diagrams and discusses advantages, operating principle and construction features of this machine. *American Air Filter Co., Inc.*

For free copy circle No. 1 on postcard, p. 121.

Steel fasteners

A metallurgical and engineering report on stainless steels for cold head fasteners is available. Report compares stainless steel to other alloys for values of properties and discusses the advantages of stainless steel fasteners. *American Screw Co.*

For free copy circle No. 2 on postcard, p. 121.

Valves

Durco type F valves are 150 lb corrosion resistant, non-lubricated plug valves designed for severe chemical services. Bulletin describes these valves with illustrations and diagrams. *The Duriron Co.*

For free copy circle No. 3 on postcard, p. 121.

Flowtrol valve

Technical bulletin describes the cushioned flowtrol valve. Valve was designed to replace globe, angle, plug or gate valves that require frequent manual opening and closing. One man can easily operate the G-A flowtrol valve to either the fully open or tightly closed position, when valve size is 2 in. or 36 in. *Golden-Anderson Valve Specialty Co.*

For free copy circle No. 4 on postcard, p. 121.

Worm gear drives

Booklet contains case histories that demonstrate the use of worm gear drives in mechanical power transmission problems relating to steel mill run-out tables, hydraulic cutter dredges, lacquer mixing tanks, feeder tables or bending rolls. *Cleveland Worm & Gear Co.*

For free copy circle No. 5 on postcard, p. 121.

Technical data

Booklet has been prepared for engineers, methods departments and lathe operators as a guide to establishing proper cutting speeds and feeds. Data forms the basis for the exhaustive figures which are presented on machinability ratings, tool angles and recommended speeds and feeds for ferrous and nonferrous alloys. Included is a discussion of what transpires during the metal cutting process with accompanying evaluation of the forces acting on a lathe tool under varying conditions of feed and speed. *The Monarch Machine Tool Co.*

For your copy write on your company letterhead to address shown on reply card.

Standard products

Catalog gives data on chains and sprockets for conveying, elevating and power transmission. Line of enclosed gear drives includes the shaft helical drive in addition to herringbone, worm and Electrofluid drives. Transmission products include ball and roller bearings and pulleys, gears, clutches and couplings. Engineered products covers vibrating screens, car icing equipment, car spotters and power unloading scoops. *Link-Belt Co.*

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FOR YOUR COPY

Money-saving products and services are described in the literature briefed here.

For your copy just circle the number on the free postcard, page 121.

and Bulletins

Radiant heaters

Bulletin explains shrink fitting of engine cylinders and how to do it with radiant heaters. Intense radiant heat is concentrated on the valve opening areas of each cylinder, while reflective aluminum spacers increase radiant effectiveness and keep efficiency high. Chromalox electric cartridge heaters are also discussed. *Edwin L. Wiegand Co.*

For free copy circle No. 7 on postcard, p. 121.

Cork

Cork as a thermal insulating material is the subject of a booklet. Featured in booklet are discussions on the microscopic properties, physical properties, thermal conductivity, mechanical properties and its resistance to moisture and liquid penetration. Booklet is highly illustrated with diagrams and pictures. *William Kenyon & Sons Ltd.*

For free copy circle No. 8 on postcard, p. 121.

Metal services

Complete services for the metalworking industry are outlined in a 20-page catalog. Facilities for, and examples of tools, dies, jigs, fixtures, gages, special machinery, fabrication, machinery repair and rebuilding and parts production are shown. Emphasis is laid on engineering facilities and equipment available for complex problems. *Pivot Punch & Die Corp.*

For free copy circle No. 9 on postcard, p. 121.

Electric tractor

Bulletins describing the Mercury "Tug" Model 550, electric tractor, which is used in the "Trackless Train" system of material handling, have been issued. Separate bulletins describe the features of the four-wheel model and the twin-three wheel model. Detailed specifications and illustrations are included and a line drawing shows the dimensions. *Mercury Mfg. Co.*

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PITTSBURGH GEAR Process

Guarantees Longer Life

Only PITTSBURGH **Armored Gears** are made according to the exclusive PITTSBURGH formula which covers a proven combination of metal, machining, AND heat-treating. It is not enough to use tool steel, which often will not stand shock loads. PITTSBURGH selects the best metal for the particular gear body, then machines it, and heat-treats the wearing surfaces to give ultimate life.

This process gives you gears that have tough, ductile cores, and teeth that wear almost interminably. PITTSBURGH **Armored Gears** are guaranteed to give five times the life of untreated gears, one to one and one-half times the life of oil-treated gears, and equal or longer life than any other gear in identical service. You can identify them by their **"Pittsburgh Purple"** corrosion preventive coating.

You'll never know how good PITTSBURGH **Armored Gears** are until you try them. Send us your specifications or give us details of service requirements so that we can make recommendations.

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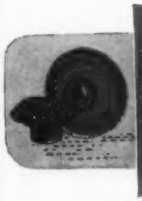

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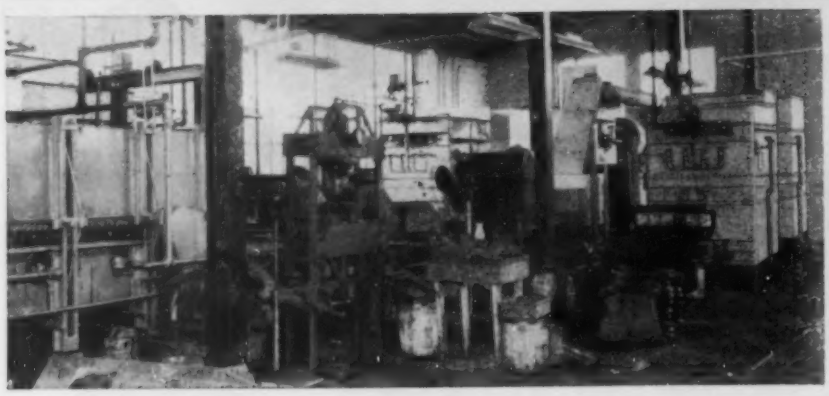

Niagara Aero Heat Exchanger quickly pulls down the initial peak load of heat in quenching . . . and saves cooling water

Accurate control of quench bath temperatures and quickly effective capacity to handle the initial peak load of heat in quenching prevents production set-backs, increases the output of your heat treating department, prevents oil fires, saves you losses from rejected parts.

Niagara Aero Heat Exchangers give you this control in both furnace and induction hardening methods. They prevent both over-heating and over-cooling of the quench bath. Hundreds of heat treaters know they prevent many troubles, constantly improve quality and increase production.

They quickly pay for themselves by saving cooling water coils and extend your quench capacity without extra water or cooling tower.

Write for Bulletin #120 giving complete information.

NIAGARA BLOWER COMPANY

Over 35 Years' Service in Industrial Air Engineering

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Experienced District Engineers in all Principal Cities

FREE TECHNICAL LITERATURE

Strip calculator

Stainless steel strip calculator offers works on the slide rule principle. Simple to operate, calculator is said to be a time and trouble saver. *Ulbrich Stainless Strip Calculator.*

For free copy circle No. 11 on postcard, p. 121.

Rupture disc

Booklet gives information to help in the correct selection of rupture disc that will give the greatest protection. Factors to be considered are presence of corrosion, and the type of corrosive agent and the level of pressure release desired. *Baker & Co.*

For free copy circle No. 12 on postcard, p. 121.

Induction heaters

Brochure offers information on the newly developed Kilotron, a high frequency (400 kilocycle) induction heater. Coverage is factual and includes discussion of the range of production line application of this technique. Description of the equipment covers the 10 KW and 20 KW models of the Kilotron. *Electric Arc, Inc.*

For free copy circle No. 13 on postcard, p. 121.

Power generation

Bulletin for power generation and conversion in steel mills includes data on cost, steam pressures and temperatures, size of turbine-generator sets, connections, station auxiliaries, conversion, etc. Bulletin provides an analysis of steel mill power generating equipment and a discussion of various power sources. *General Electric.*

For free copy circle No. 14 on postcard, p. 121.

Packing data

Six technical bulletins, each featuring data on individual types of packings, have been issued. Compiled to save time for designers, engineers and maintenance departments, each bulletin contains information and standard sizes for only one specific style of packing. *E. F. Houghton & Co.*

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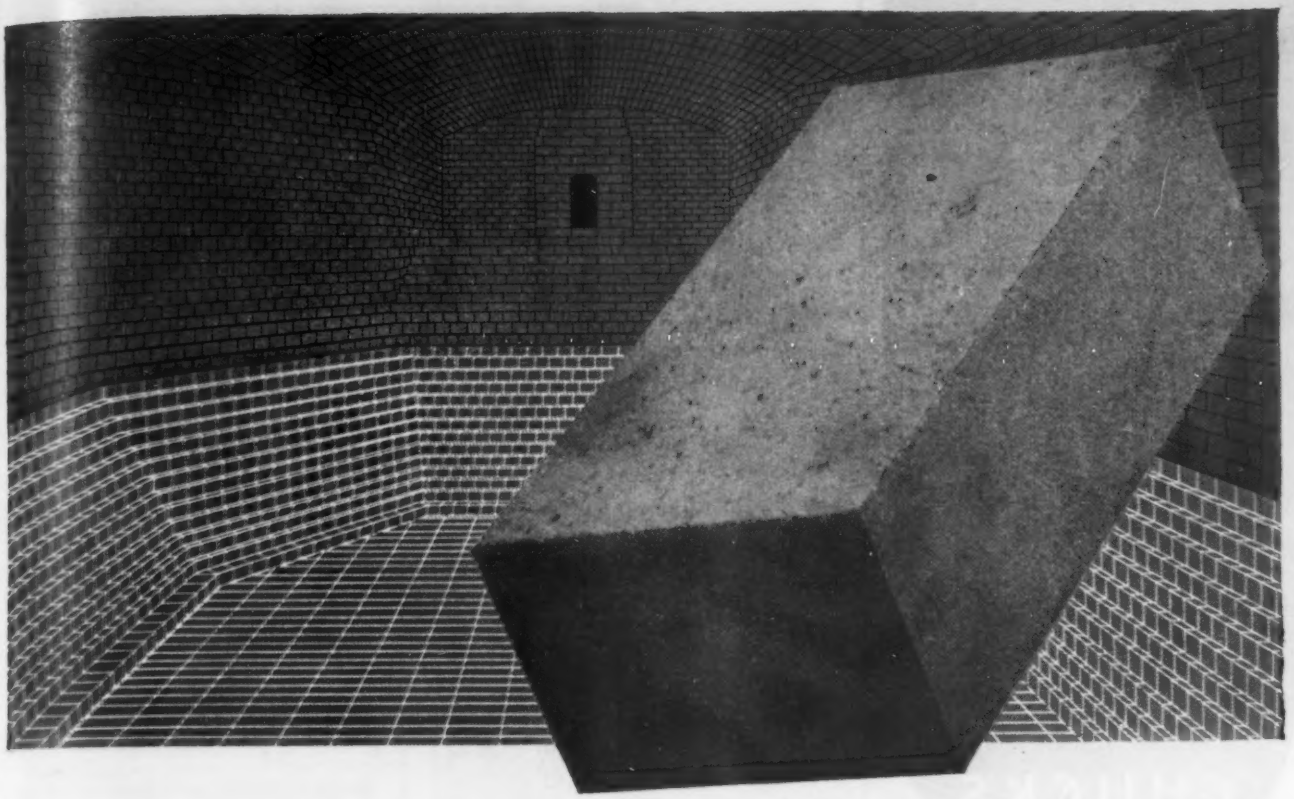

GET EXTRA SUB-HEARTH SAFETY WITH PERMANENTE PERICLASE D-S BRICK!

MAJOR STEEL COMPANY ceramists have found that Permanente Periclase D-S Brick meets their requirements for the safest, most efficient sub-hearth refractory.

This superior brick is being used in open hearths of leading steel producers because it gives *maximum protection against costly breakthroughs, gives longer sub-hearth life.*

Permanente Periclase D-S Brick has been *designed especially* to withstand conditions that exist in the sub-hearth and up to the slag line. It is made from pre-shrunk, accurately-sized Periclase grains derived from sea-water magnesia and has all the properties outlined by ceramists as most desirable.

Among these properties are:

High MgO—Contains more than 95% MgO (165 pounds of MgO per cubic foot of brick).

Chrome-free—Eliminates the reduction of chromium oxide when sub-hearth brick is in contact with molten pig iron or high carbon steel. Under these conditions, chromium would be absorbed by the bath with resultant damage to the refractory structure. Carbon monoxide generated during a heat penetrates to the sub-hearth and also reduces chromium oxide in chromite-bearing brick. (Brick contains only 0.8% Cr_2O_3).

Low iron oxide—Minimizes the effect of alternate oxidation and reduction of iron oxide and other iron compounds which can cause damage to refractory brick. (Brick contains only 0.6% Fe_2O_3).

Low calcium oxide—No refractory damage caused by slaking during a slow heat-up or while the furnace is idle. (Brick contains only 1.2% CaO).

With all its many advantages, Permanente Periclase D-S Brick gives you the ultimate in sub-hearth safety and durability—yet costs no more.

Write for full information. *Kaiser Chemicals Division,* Kaiser Aluminum & Chemical Sales, Inc. Regional sales offices: OAKLAND 12, California, 1924 Broadway; AKRON 8, Ohio, First National Tower Bldg.; CHICAGO, 518 Calumet Bldg., 5231 Hohman Ave., Hammond, Indiana.

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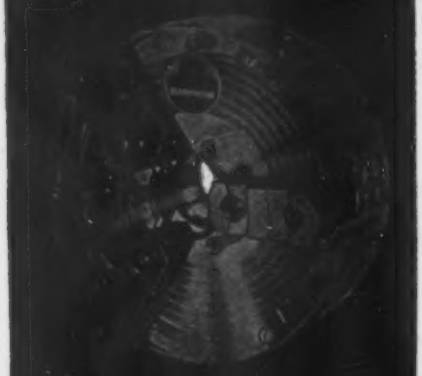

in HORTON CHUCKS

New plastic demonstrators show the advantages of Horton's Famous Five Extras.

1. Exclusive pilot hole construction
2. Chrome nickel steel scroll heat-treated to 40-45 Rockwell C
3. Exclusive replaceable pinion bushings
4. Self-contained operating screws
5. One-piece body construction

Now you can SEE these built-in extras in actual operation. Ask your Horton Distributor NOW!

HORTON CHUCK
Windsor Locks, Conn.

Machining:

Insert carbides increase production, cut tooling cost.

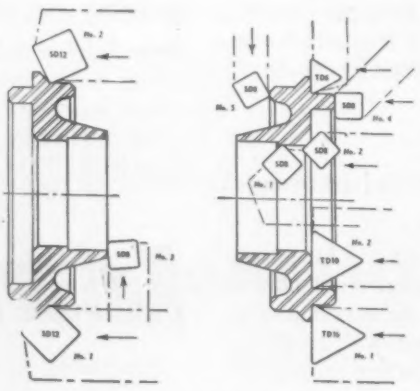
Production of SAE 1020 forged steel liner rings at the plant of a prominent equipment producer has been increased from 200 to 800 pieces per shift by using insert type tungsten carbide tooling. Both sides of the workpiece are machined by double indexing a 60 hp 8-spindle New Britain Automatic and reversing the part in the chuck. Operations include multiple turning of the OD and ID plus facing and chamfering.

Work is handled at a feed of 0.006-ipr and speed of 535 rpm at 570 max. sfpm. Depth of cut varies from ⅛ to ⅝-in. on roughing and 0.030 to 0.050-in. on finishing. These operations were previously performed with standard tipped carbide tooling which required excessive downtime for tool changes.

Rotate Cutting Edges

With standard Kendex square and triangular inserts of grade K3H Kennametal, a new cutting point is obtained simply by loosening the socket-head screw and rotating the tip to a new cutting edge. By interchanging inserts of the same size even greater economies are effected. For example, holder No. 1 for an SD-12 insert has a 6° side rake. When its four cutting edges have been expended, the normal 12° side relief is decreased by grinding it to 6°, then the insert is used in holder No. 2 with no side rake for finish turning.

Likewise, after all cutting edges on the TD-10 insert holder No. 1 have been utilized, it is interchanged with a TD-10 insert in holder No. 2 and opposite corners used. Extended life is similarly obtained by switching their SD-8 inserts.



Interchangeable inserts . . .

Descaling:

Pre-anneal coatings ease scale problem on titanium, stainless.

Scale removal problems on titanium and stainless steel have been greatly reduced by two new processes recently developed at Boeing Airplane Co., Seattle, Wash. One method inhibits scale formation while the other converts the oxides to a more conveniently removable form. Both processes coat the metals before annealing.

The titanium coating consists of carbonates combined with nitrates in the proper proportions. The nitrates act as oxidizers and tend to convert the normal scale into a higher oxygen content or different crystalline structure. TiO_2 in rutile form constitutes most of the scale in the moderate temperature range where most heat treatment is done. The carbonates in the precoating are believed to convert the normal scale oxides or the higher oxides into a titanate form.

WANT MORE DATA?

You may secure additional information on any item briefed in this section by using the reply card on page 121. Just indicate the page on which it appears. Be sure to note exactly the information wanted.

The scale, produced by the coating and the heat treatment, cracks on cooling and can be removed with gentle rubbing. Any remaining scale can be removed by a single brief pickle in a modified conventional nitric-hydrofluoric acid pickling solution.

Descaling is also a troublesome problem on certain stainless steels such as AISI 310 or 17-7 PH. Heat treating temperatures are so great that the pre-coat used on titanium boils or melts from the surface.

Silica Treats Stainless

A silicon-bearing substance is now used which decomposes in the furnace and deposits a coating of finely divided silica on the metal. The barrier of silica, which can be rinsed or brushed off after heat treating, markedly inhibits oxidation.

With the silica treatment, stainless scale can be pickled off in two to four minutes.

Both of these processes are in early stages of development and several factors are yet to be determined.

Plastics:

Low cost plastic molds good for short runs.

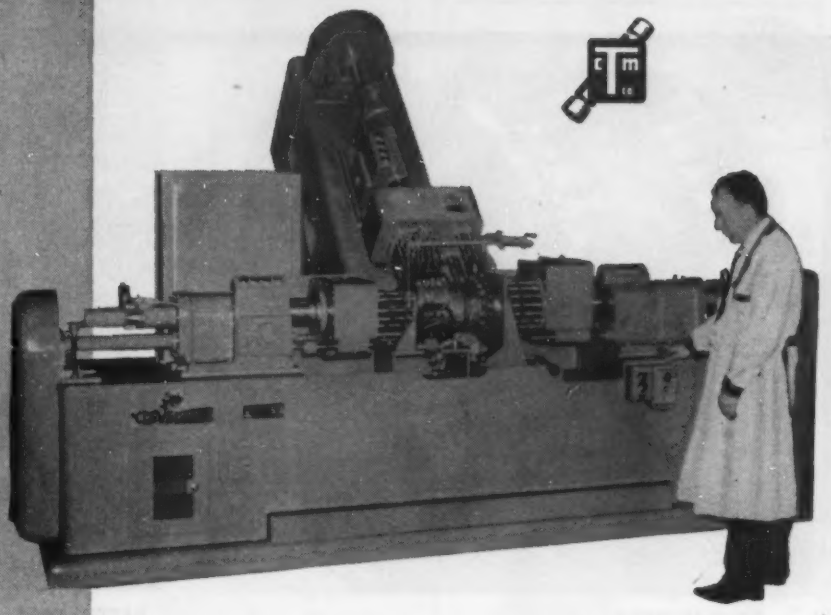
A new flexible mold method using vinyl resin base plastisols makes possible production runs of intricate machine parts up to 500 units at a very low mold cost, it is reported.

The method was developed at Houghton Laboratories, Inc., Olean, N. Y. largely through the use of Bakelite epoxy and vinyl resins.

The low temperature cure and low shrinkage of these resins eliminate costly mold heating equipment. Gears, cams, bobbins and similar machine parts cast from Bakelite epoxy resins are light in weight yet have considerable shear strength and dimensional stability. Undercut parts that require costly split molds are easily cast from flexible molds of vinyl resin-base plastisol.

The flexible mold method is applicable to the frequent changes made in the design of electronic

Another Cleveland Design to Speed Production!



3-WAY HORIZONTAL TAPPING MACHINE

OPERATION: Tapping 48 holes in crankcase. Tapping time (48 holes) 7.9 seconds.

DESCRIPTION: A Cleveland Three Way Horizontal Tapping Machine with two F-2 Cleveland Tapping Heads opposed at each side and one F-2 head at 45° up at the rear with multiple heads on each head to suit the part. The right hand tapping head has a multiple head with 18 spindles; the left hand tapping head has a multiple head with 12 spindles; the rear vertical unit has a multiple head with 20 spindles.

The operator loads part into position between the tap guard plates and then moves the lever to the closed position and starts the machine. All heads tap simultaneously.

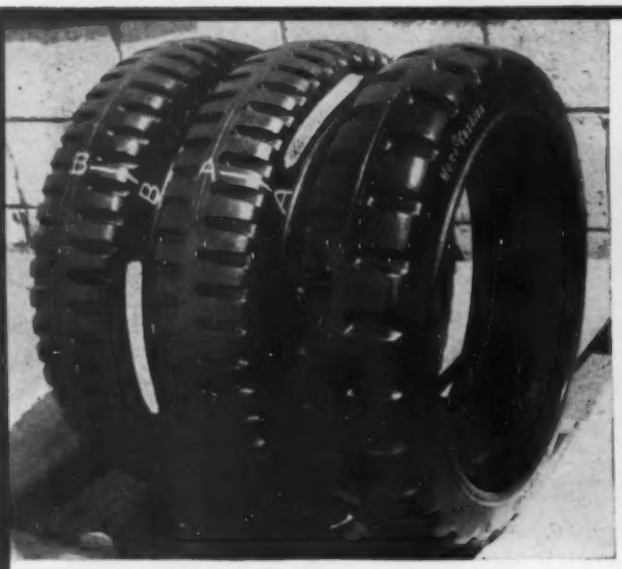
Send for your copy of this Guide

Write today for Catalog No. IA-94

CLEVELAND tapping machine co.

A Subsidiary of AUTOMATIC STEEL PRODUCTS, INC. • CANTON 6, OHIO

TORTURE TESTS PROVE



BEFORE TEST

Three standard cushion-type solid tires were used in this test. The Monarch Mono-Cushion was selected from stock awaiting shipment . . . competitive tires were purchased from authorized dealers of two other leading industrial tire manufacturers.

AFTER TEST

This unretouched photo shows comparative condition of same three tires after each had undergone an absolutely identical testing procedure. All tests were made the same day . . . using a constant time interval and same testing equipment.

. . . THE SUPERIORITY OF *Mono-Cushion*® INDUSTRIAL TIRES

TEST EQUIPMENT . . . a standard dual-drive lift truck carrying a loaded tote box weighing 4,864 pounds. Deliberate overload of approximately 44% created by mounting a single 22x6x16 cushion tire on each drive wheel (which normally carries dual tires of this size). Overload increased severity of test and accelerated tire fatigue.

TEST PROCEDURE . . . loaded truck was operated continuously at maximum speed for a fixed time interval. Truck's brakes were jammed on periodically throughout testing period to cause sudden stops and create extreme shock loads.

TEST TRACK . . . was a combination of black top and gravel road surfaces to simulate severe operating conditions (for both indoor and outdoor applications). A railroad spur in the plant yard was included in the test pattern.

HERE ARE THE FACTS

THAT MEAN SAVINGS TO YOU

(1) ONLY MONO-CUSHION SURVIVED THE TEST . . . the other tires were too damaged for normal use. TIRE "A" lost a section of tread 6 inches long and 1 inch deep. TIRE "B" was badly chipped and had two deep splits that reached almost to rim. This is additional proof that *Mono-Cushion is a better buy . . . it costs less initially and lasts longer.*

(2) MONO-CUSHIONS GIVE YOU MORE TON-MILES PER DOLLAR . . . because the rubber stocks developed especially for these tires are compounded from *higher quality materials than are used in the best "premium" passenger car tires.* This is no idle claim. It is another fact previously known only by Monarch's key personnel.

(3) MONARCH SUPPLIES PERFORMANCE-PROVEN INDUSTRIAL SOLID TIRES. Working closely with lift truck manufacturers, Monarch engineers have created tire and tread designs that assure maximum cushioning action for vehicles, loads, floors and drivers. A leading supplier of pressed-on tires, Monarch has a type and size to meet every lift truck requirement.

WHEN YOU NEED TIRES, REMEMBER MONARCH . . . THE KING OF THE SOLIDS

YOUR NEAREST MONARCH TIRE DEALER is listed in the Yellow Pages under "Trucks-Industrial-Parts & Supplies" or "Tires-Industrial". If current directory does not have a listing, write direct for complete catalog and name of nearest dealer.

THE MONARCH RUBBER COMPANY

3053-MR

230 Lincoln Park • Hartville, Ohio

7-255 General Motors Bldg., Detroit 2, Mich.

Make part mold . . .

components. Experimental models can be produced for less cost by the flexible mold method than with other types of molds, it is claimed.

An average of 5 castings or potted assemblies, can be made from a single mold. Simpler forms may have higher runs but a limit is set by the gradual extraction of plasticiser from the mold. For average castings, about 100 flexible molds can be made with a gallon of Bakelite vinyl resin-base plastisol.

Two steps are required to make the molds. The first step consists of pouring fluid vinyl resin-base plastisol around the object to be reproduced and curing it at 350°F for 15 to 20 minutes depending on the mass of plastisol used.

After curing, the original mold pattern is popped out of the mold leaving an accurate mold cavity. The second step is to fill this cavity with the cold-setting epoxy resin.

Cast plastic . . .

if you punch, cut, or bend metal...

check these *Lewthwaite* tools

They're made for you

Punches and Dies

Ever need punches and dies fast? We have them waiting for you.

In stock for immediate shipment are 76 types of punches and 65 types of dies in a large range of round, oval, flat, and square sizes to fit most makes of presses.

For the few punch presses our tools don't fit, we will gladly quote on making holders to take standard punches and dies with their repeated saving of time and money.

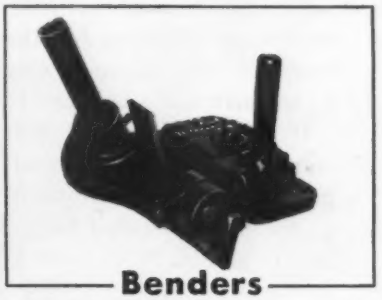
Cutters

Our hand operated bench type cutters are made in three handy sizes. By simply changing blades you can cut angles, channels, flat bars, rods, and wire rope. Besides this versatility, these cutters are built to keep doing the job for you year after year.

Punches

Our Front Lever Bench Punches were designed to fill the need for a small, hand operated punch that would not only stand up under constant use but would also hold the punch and dies in true alignment at all times.

Capacity: 7/16" hole through 1/4" steel or equivalent. Weight: 70 lbs.



Benders

Our Fisher Bender (also known as Metal Lathers' Bender) is used in many trades because of its ease of operation and durability. It will bend 7/16" square or round iron, 2" x 1/2" channel iron, 2 1/4" x 5/16" flat iron cold. Weight 40 lbs.

Send for catalog sheets giving full information on our tools—including prices.

T. H. LEWTHWAITE MACHINE CO.

308 EAST 47th STREET, NEW YORK 17, N.Y.

How to make 150 containers disappear

Another example of packaging magic that couldn't be performed without Signode Steel Strapping!

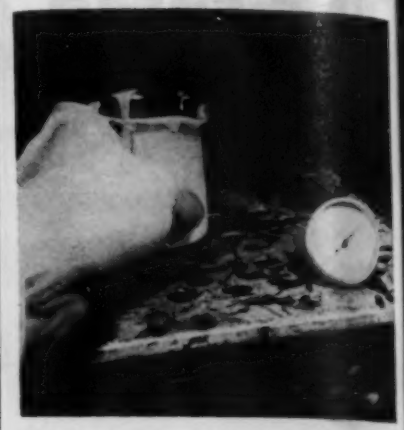
The pallet load shown here contains 150 sub-assemblies, nested on returnable wooden trays, packaged for easy handling and shipping by strong bands of tensioned Signode Steel Strapping.

This method of packaging eliminated the use of 150 individual containers, and the materials needed to pack and seal them. Units were handled *once*—at the assembly line, where they were placed on the trays. Strapped to the pallet base, which also served as a tray, the trays became a single, pilfer-proof unit, easily handled by *one* man and a fork truck!

If you now ship by pallet or have products which can be shipped that way, and the economies apparent in this method of product packaging, handling and protection interest you, we will gladly supply detailed facts. SEND FOR OUR FOLDER SHOWING 6 BASIC WAYS OF UNITIZING.

SIGNODE Steel Strapping Co.

2623 N. Western Ave., Chicago 47, Ill.
In Canada: Canadian Steel Strapping Co. Ltd., Montreal • Toronto
Offices coast to coast—Foreign Subsidiaries and Distributors World-Wide



Low temperature cure . . .

The casting gels in 1 to 3 hours and hardens in up to 3 hours later at room temperatures. The finished part is then popped out of the flexible mold.

Pop out part . . .

The epoxy resins are widely used for embedding or potting electrical components. The room temperature cure of this resin protects electronic assemblies that could not withstand normal baking heat. They also make a strong adhesive bond with metal, glass, plastics or ceramics and absorb jarring or shocks that might otherwise break fine connections. Mold tolerances can be kept to within ±0.005 of an inch.

Forming:

New stretch forming machine features a 360° rotating arm.

Many hand forming and secondary operations on aircraft parts have been eliminated by a new stretch forming machine. The

A.W.

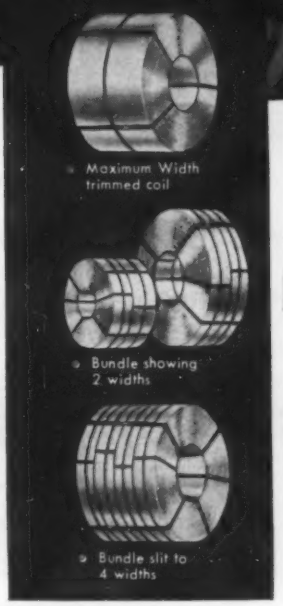
CONTINUOUS MILL

PLATE • SHEET • STRIP—*available in hot rolled quality*

Years of Experience Produce this Top Quality Steel

Quality tested to the highest standards known, is our first consideration in producing Alan Wood Steel. Over 127 years' experience in steel making, and a policy of undivided mine-to-mill responsibility is your assurance of the finest quality steel it is possible to produce. Rigid metallurgical control throughout production is your guarantee of getting *exactly what you want.* Our Continuous Mill produces steel from .059" to .500" —to a maximum width 25½ inches.

Alan Wood's Delaware Valley location . . . hub of the East's giant industrial and transportation area also means faster deliveries.



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CONSHOHOCKEN, PA.

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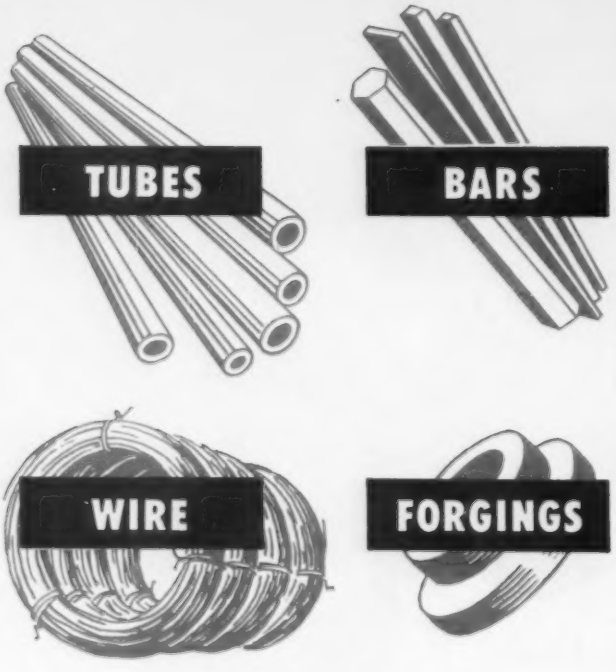
STEEL TUBING and BARS



Write for the latest stock list

Contact our nearest office or write to Peterson Steels, Inc., Springfield Road, Union, New Jersey. Address: Dept. I

PETERSON STEELS, INC.

UNION, NEW JERSEY

Detroit, Michigan • Chicago, Illinois

Carousel model, on which the operator rides the 360° rotating arm, is designed and built by Hufford Machine Works, Inc., El Segundo, Calif. Parts are produced that could not previously be made by a single machine.

The 360° arm rotates around a stationary die and table to form full circles. Stretch-wrap forming can be complemented with a following roller or wiper which operates simultaneously. This roller, attached to one of the rotating arms, may be operated clockwise or counter-clockwise.

Other operations include bulldozing, joggling, stretch-straightening, forming reverse bends and "S" curves.

All tension cylinders are double acting—applying either tension or force to the work. They are adjustable for height, permitting dies to be set at any level.

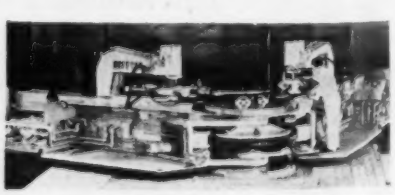
Tools Changed Quickly

Tooling is quickly interchangeable merely by pulling a pin in the clevis attached to ram ends. The vertical pin also permits free swivelling of jaws—expediting fast loading and easy set-ups.

A novel feature unlike former Hufford machines is the inclusion of a third tension cylinder. This permits simultaneous application of tension from both ends of the workpiece. The remaining rotating arm is thus released for other operations such as rolling, ironing, etc.

The stationary cylinder can also be used opposite a joggle position to apply pressure or to bulldoze a two-piece die in forming certain reverse bends.

Each rotating arm is under independent control and can be operated at variable speeds in either direction. No special relation must



Forms full circle . . .

Big and "little" friends: 26,000 and 10,000 lb. trucks

Save more money by handling bigger loads —with the world's largest standard lift truck—26,000 lbs.

The Clark-Ross Y-260 will handle bigger outdoor loads than any other lift truck, and it will go places where no other lift truck can travel! This truck is big enough to handle jobs which formerly required a crane and operator, hook man and trucker. It has the utmost traction and flotation—huge 14.00 x 20 tires are standard front and rear, with excellent weight distribution and 9 in. minimum underclearance. Its 17½ ft. turning radius permits it to be used in yards laid out for smaller trucks.

This Y-260 is *built* for 26,000 lbs. (at 36 inches)—not just beefed-up. It's as easy to drive as a truck half its size; power steering and power brakes are standard. And a brake selection switch enables the driver to apply brakes to *either* drive wheel, when one wheel has lost traction in slippery grounds. Maintenance access is excellent, wrap-around counterweight has minimum over-hang, operator visibility is outstanding. In general, *this lift truck is a beautiful brute!*

For big jobs, you'll want more details on the Y-260. Call your local Clark dealer, listed in the Yellow Pages under "Trucks, Industrial," or send the coupon.

See us at the '54 Iron and Steel Exposition

CLARK EQUIPMENT

Industrial Truck Division
Battle Creek 51, Michigan

Send details on Y-260

Name_____

Firm_____

Address_____

City_____

be maintained between arm speeds nor between the relative position of each arm except to prevent one from overtaking the other.

Controls for each arm are contained within a pair of steel boxes with cable attachment. A quick plug-in connector enables both control panels to be used on the same arm under the eye of a single operator, or one control panel can be used on each arm with dual operators.

Cycling of various movements is by push-button control. All operations, except two, are hydraulically actuated.

Bolts:

High strength bolts used in 682 ft atomic smoke stack.

One of the many problems involved in building the 222-acre atomic power plant at Waverly, Ohio, is the disposal of gaseous and other discharges. To protect the surrounding area engineers built three stacks, each 682 ft above plant grade and averaging about 300 ft higher than the nearby hills.

Problem of holding the stack sections together was solved by using high-strength bolts instead of the usual rivets.

Bolt tightening crews were trained to use air impact wrenches which could be operated under closely controlled conditions to produce fast, accurate, economical work. Although the bolts, washers and rivets delivered to the job cost about six times more than rivets, the overall cost was lower. Speedy training of expert bolting crews and their preference for the light, easily operated impact wrenches were the major cost advantages.

Gears:

Nylon inserts in gear teeth reduce backlash.

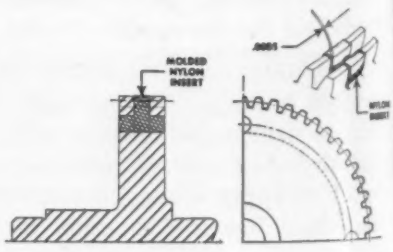
Molded nylon inserts laminated through the center of high precision gears have reduced backlash to negligible amounts while holding torque to a minimum.

In a gear box manufactured by Dexter Machine Products, Inc., Chelsea, Mich. backlash is reduced with the unique properties of nylon.

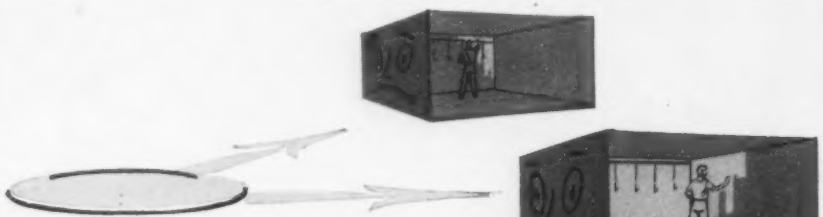
A typical example is a gear box which has a 90:1 ratio and an output torque rating of 30 oz. in. Although 1.0 oz. in. friction torque was permitted, it is held to only 0.375 oz. in. Backlash of the complete train measures only 0.02°.

Keeps Torque Low

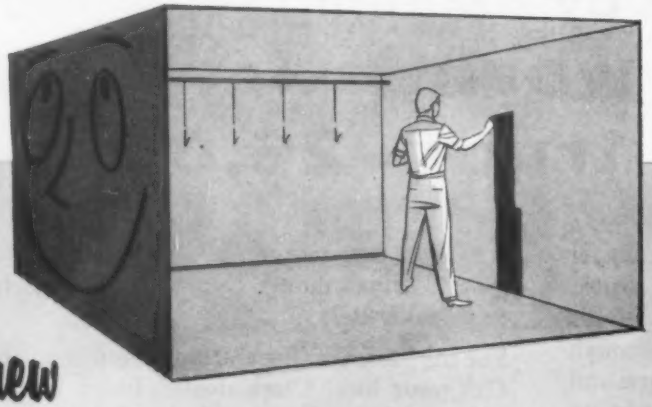
Backlash in gear trains used for precision control in aircraft, ordnance, radar and research equipment has always been a troublesome problem—especially when torque must be minimized and the gears must operate equally well in both directions. Adjustable bearing mountings are not always practicable.



Nylon fills gap . . .



Clean spray booths in a matter of minutes



new

DuBOIS PEEL FILMITE

removes dried over-spray from paint spray booths 1000% quicker. By spraying on PEEL FILMITE with regular spray equipment, booths are ready to operate as soon as booth walls are dry.

When over-spray accumulates, score the coating and peel off sheets at a time.

PEEL FILMITE is a high strength plastic film that stays flexible, doesn't age. PEEL FILMITE is safe!

Flame Proof!

Contact DuBois today for complete details on new PEEL FILMITE. It cuts costs . . . cuts labor.

The DuBOIS Co., Inc.

Cincinnati 3, Ohio Los Angeles 33, Calif.

Serving Industry Since 1920

DuBois Warehouses And Representatives Are Located Coast-To-Coast

Dept. G

Gears built by this company have a central lamination of nylon flanked on either side by steel. The blanks are cut and shaved by conventional methods.

After cutting, the nylon portion of the gear grows slightly, increasing tooth thickness enough to reduce backlash to a negligible amount—but without increasing torque. The nylon does not assume any of the gear load. This is taken entirely by the outside steel portions.

New Books:

"Symposium on Non-Destructive Testing." Symposium discusses principally the testing of metal such as sheets, rods, castings, forgings, machined assemblies, and it also provides data and ideas for non-destructive testing of other materials. Text is illustrated with photographs of equipment, manipulative techniques and oscilloscope patterns when applicable, as well as diagrams and charts. American Society for Testing Materials, 1916 Race St., Philadelphia 3. $2.00. 105 p.

"Adhesive Bonding of Metals," by George Epstein. Purpose of this book is to give sufficient details so that an engineer with a metal bonding problem will be able to determine if an adhesive-bonded joint would be advantageous, what type to select, how to employ it and how to design the joint for optimum performance. Reinhold Publishing Corp., 330 West 42nd St., New York 36. $2.95. 218 p.

"Developing Management Ability," by E. G. Planty and J. T. Freeston. Contains 600 questions and answers asked the authors by businessmen interested in establishing or improving training and development facilities and in improving their own efficiency. Answers are designed to help improve work performance at all levels. The Ronald Press Co., 15 East 26th St., New York 10. $7.00. 445 p.

To be sure you're getting top quality lightweight castings, you'll want to look for:

- An experienced manufacturer
- A product made under close laboratory control and inspection
- Competent designers to work with your engineers
- A wide range of specifications and alloys
- Production economy

And you won't have to look far . . . just get in touch with WELLMAN. We'll be happy to help you with your castings problem.

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Well-Made WOOD AND METAL PATTERNS

THE WELLMAN BRONZE & ALUMINUM CO.

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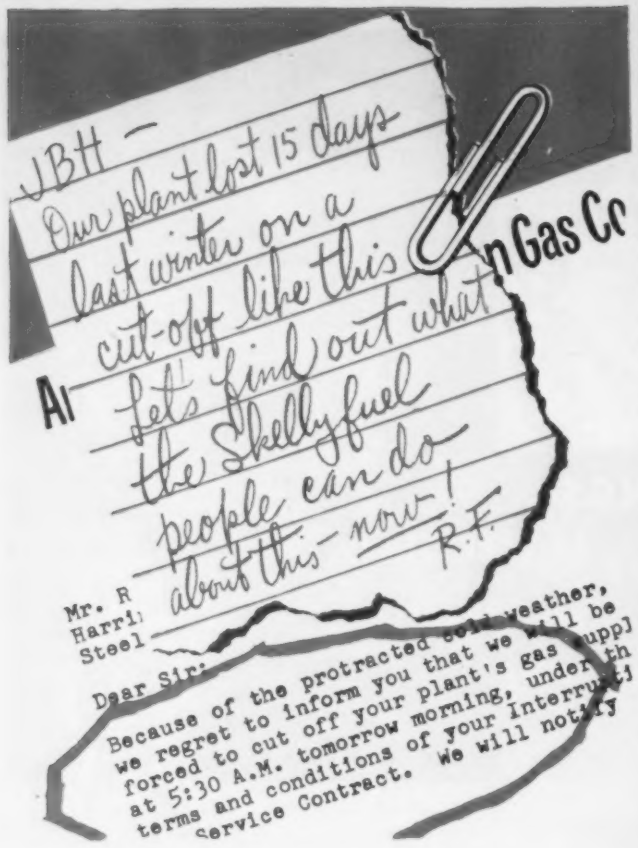


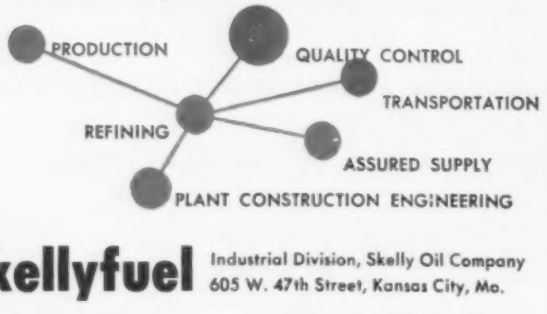
Don't let this happen to YOU!

Would a sudden cut-off of your plant's normal fuel supply deal a knockout blow to your production and your profits?

Get positive protection against costly fuel-gas interruptions and plant shutdowns! Do as scores of leading manufacturers are now doing: protect your plant with a modern propane or butane gas standby plant—designed, engineered, constructed and serviced by Skellyfuel.

We'll be glad to demonstrate to you how the Skellyfuel "one-package" proposition can solve your emergency fuel problems. A call or a letter will arrange a meeting to suit your convenience.

Skellyfuel covers everything from blueprint to BTU!



Skellyfuel Industrial Division, Skelly Oil Company
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PERFORATED METALS

The few perforations illustrated are indicative of the wide variety of our line—we can *perforate almost any size perforation in any kind of metal or material required.* Send us your specifications.

Sixty-seven years of manufacturing perforated metals for every conceivable purpose assure satisfaction.

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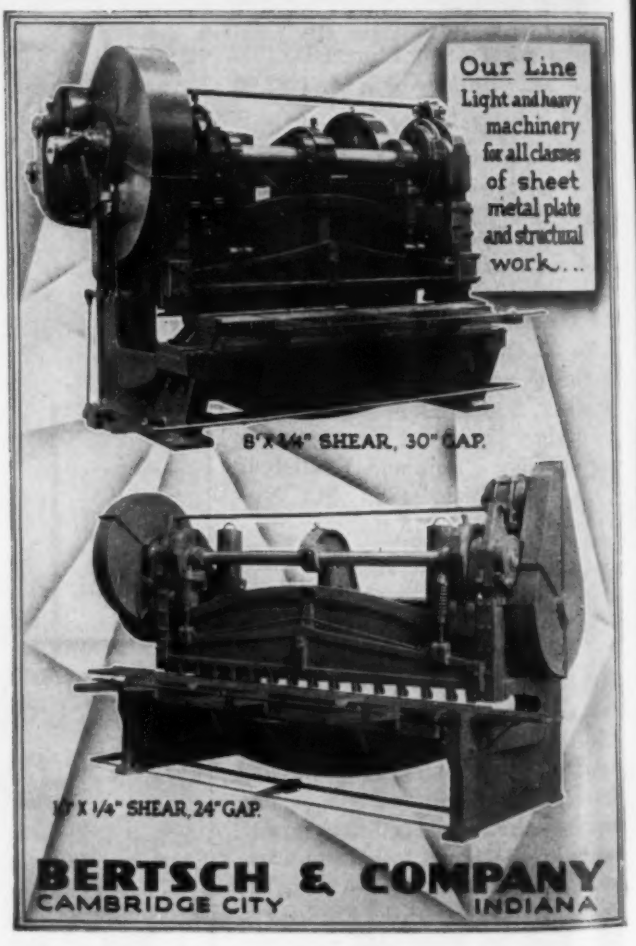
TIN, STEEL, COPPER, ALUMINUM, BRONZE, BRASS, ZINC, ANY METAL, ANY PURPOSE

CHARLES MUNDT & SONS
50 FAIRMOUNT AVE. JERSEY CITY, N. J.


Our Line
Light and heavy machinery for all classes of sheet metal plate and structural work...
8' X 1/4" SHEAR, 30" GAP.
10' X 1/4" SHEAR, 24" GAP.
BERTSCH & COMPANY
CAMBRIDGE CITY
INDIANA

TECHNICAL BRIEFS

"Diesel and High Compression Gas Engines — Fundamentals," by E. J. Kates. Planned for logical step-by-step instruction on diesel and high compression gas engine. Beginning with an explanation of what a diesel engine is, it gives features and construction of the engine. American Technical Society. 848 East 58th St., Chicago 37, Ill. $5.50. 396 p.

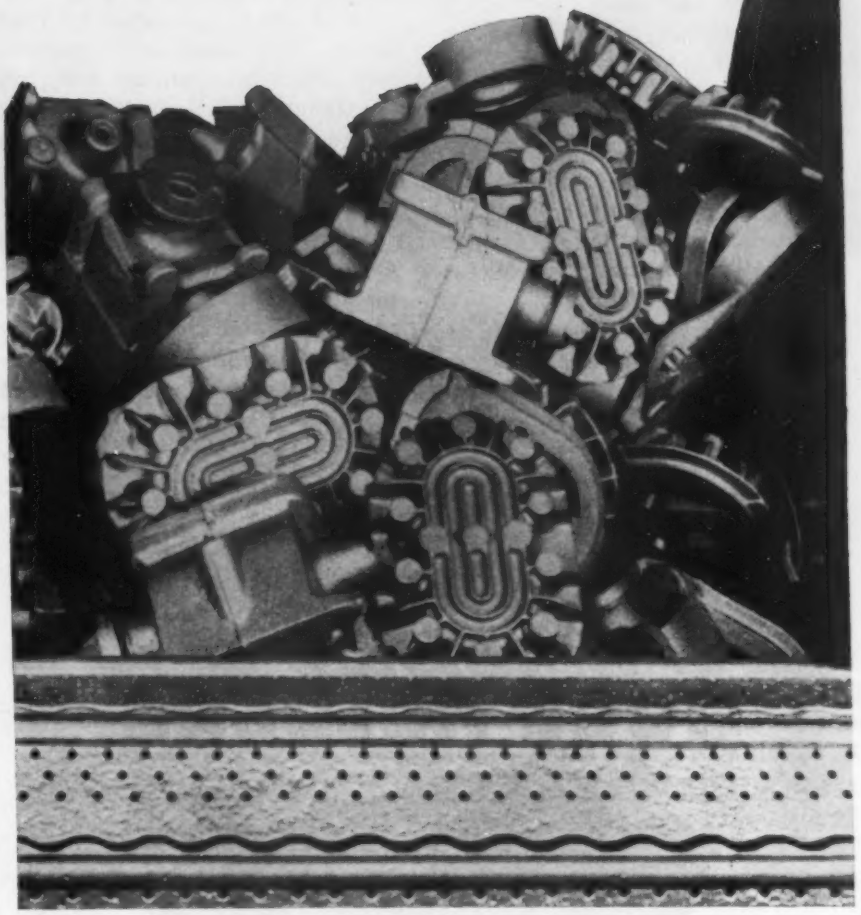
"The Sulphur Data Book," edited by W. N. Turner, compiled by Freeport Sulphur Co. Presents a comprehensive collection of data on sulphur. Includes material from literature, from private sources and from experience gained by Freeport during 40 years of mining and research. McGraw Hill Book Co., Inc., 330 West 42nd St., New York 36, $5, 140 p.

"Practical Gear Design," by D. W. Dudley. Manual gives information in practical form on the design, manufacture and use of gears. The book covers the entire range of gears — spur, helical, worm, bevel, etc. Practical helps are data on shaving of gears, shear cutting, equations, curve sheets and tables to aid in gear design. McGraw-Hill Book Co., Inc., 330 West 42nd St., New York 36. $7.00. 335 p.

"Construction During Five Decades," Department of Labor. Handbook of historical information covering construction during the years 1907-52. Text, charts and detailed statistical tables are included. Contents include geographic division, state, metropolitan area and city statistics. Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C., 45¢, 75 p.

"How to Operate Excavation Equipment," by Herbert L. Nichols, Jr. This book is a simple, readable how-to-do-it book about the machinery which digs, moves, and spreads the earth. North Castle Books, 212 Bedford Rd., Greenwich, Conn. Economy, $1.50; library, $2.50; deluxe field, $3.00. 150 p.

These castings were cleaned by "CERTIFIED" ABRASIVES!



"Certified" does a better job in less time at lower cost.

Why? Because "Certified" Samson Shot and Angular Grit is made *extra-tough. Extra-tough* to clean more thoroughly, more quickly. *Extra-tough* to last . . . to be reused again and again without breaking down.

It all adds up to lower time, labor, and abrasive costs for you. See for yourself! Switch to the abrasive made by the oldest abrasive manufacturing company in the world . . . switch to "Certified" Abrasives!

THE STANDARD OF EXCELLENCE FOR OVER 60 YEARS

PITTSBURGH CRUSHED STEEL CO., Pittsburgh, Pa.
STEEL SHOT AND GRIT CO., Boston, Mass.

Sheet Alloy:

Weldable titanium alloy has high strength for aircraft use.

Titanium-base alloy sheet is now in production at the Midland, Pa. plant of Rem-Cru Titanium, Inc. This new alloy, containing 5 pct Al and 2½ pct Sn. has been designated Rem-Cru A-110AT.

The new alloy is readily welded with the same techniques used for commercially pure titanium. Fusion welded joints in this material have exhibited excellent ductility. At room temperature, the sheet material has a minimum tensile strength of 115,000 psi.

Availability of this alloy in sheet form in thicknesses down to 0.025 in. opens up many new aircraft applications for titanium.

Resin:

New formulation meets need for resilience in tools, dies.

A tool and die material, based on Shell Chemical Corp's. Epon resin, meets the need for resilience in tools, such as drop hammer punches. Developed by Kish Resin, Inc., Lansing, Mich., this new material retains the low shrinkage qualities of the Epon resins as well as their excellent dimensional stability, adhesion and chemical resistance.

Since shrinkage during cure is as low as 0.0001 in. per in., complicated die contours can be reproduced accurately, eliminating costly machining and hand finishing. Adhesive properties of this material assure permanent bonding to dissimilar surfaces. Repairs can be made almost overnight by casting new material over the original contour.

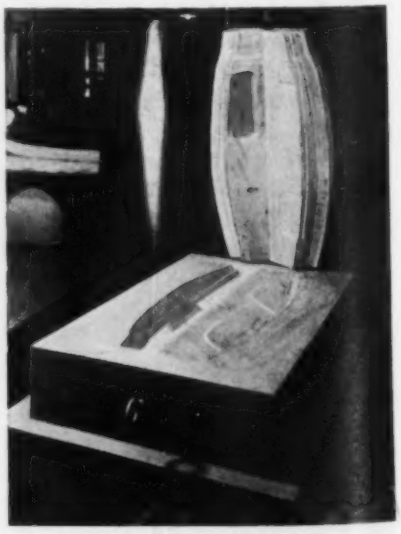
Applications in the aircraft, automotive and metal fabricating industries indicate a substantial reduction in tool cost and tool delivery time over conventional methods. Production drawing and forming on both ferrous and nonferrous sheet metal is possible without loss of dimensional stability or detail.

The new materials are providing precision service in draw, form and stretch form dies, die strippers, die models, vacuum molds and locators for trim and pierce dies.

Foundry core boxes and patterns are among the newer applications. Pattern life compares favorably with aluminum and other pattern materials while original cost is about one-third. Pattern delivery time is reduced by 75 pct.

FOR MORE DATA ON MATERIALS

More information on any item reported in this section may be obtained by using the reply card on page 121. Indicate the page on which the item appears and note exactly the information wanted.



Low shrinkage in dies . . .

ARMSTRONG *Carbide* TOOL HOLDERS

For Higher Speeds, and Heavier Feeds

ARMSTRONG Carbide Tool Holders and ARMIDE (Carbide Tipped) Cutters come in cased sets for tool rooms and maintenance departments, and individually in all sizes for general machine shop and production turning. They permit not only the ready machining of sand-filled castings, the hardest and toughest steels as well as many heretofore "unmachinable" materials, but also make practical much heavier cuts and cutting speeds up to 600 f.p.m. on ordinary work. They also run from 10 to 100 times as long between regrindings.

Write for Catalog

ARMSTRONG BROS. TOOL CO.

"The Tool Holder People"

5209 WEST ARMSTRONG AVE., CHICAGO 30, ILLINOIS

NEW YORK • SAN FRANCISCO

Insulation:

New material offers high dielectric strength.

An insulating material possessing high dielectric strength combined with extreme toughness has been developed for use in motors, generators and transformers. Standard insulation has been combined with Mylar, a DuPont polyester film, to give it the superior properties.

The insulation itself is a 100-pct rag-base type of vulcanized fiber which has a density lower than conventional rag papers. The material also has the advantage of excellent cuffing properties.

Developed by National Vulcanized Fibre Co., Wilmington, Del., the new material is particularly advantageous for motor slot and transformer insulations where exceptional dielectric strength is a prime factor.

New Carbide:

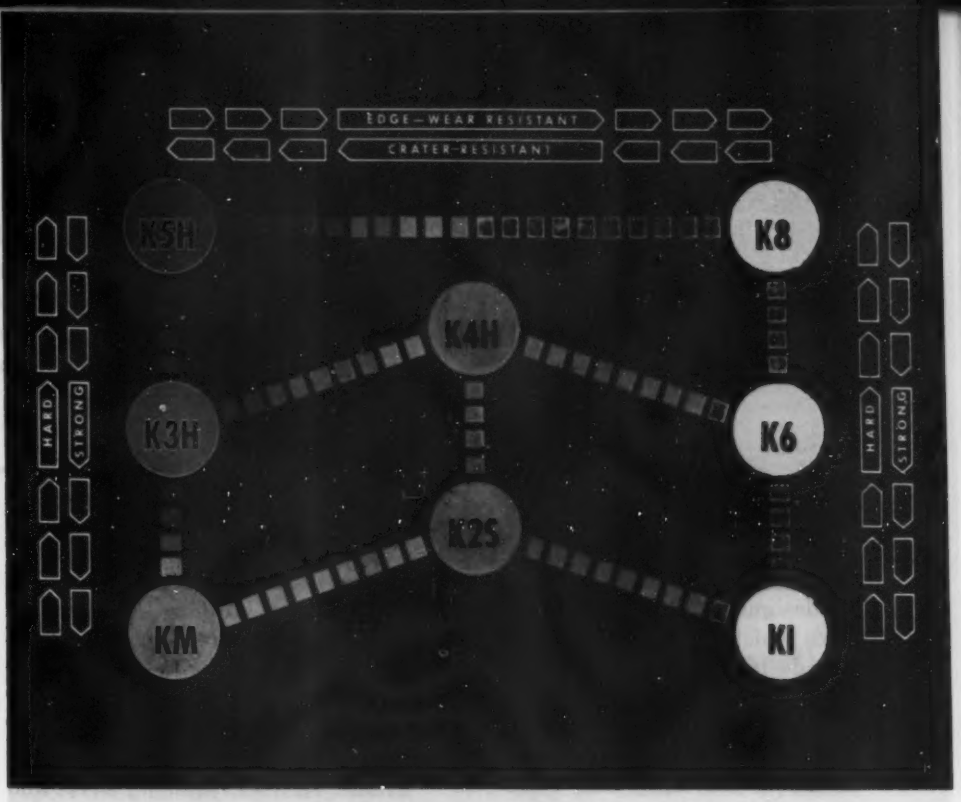
Superior cutting material saves tungsten, cobalt.

A new carbide cutting material containing no tungsten and no cobalt is the result of adapting the best of European techniques of making titanium carbide. The process, developed by Firth Sterling, Inc., is important in that it not only produces a superior products, but releases tungsten for other uses in critical times.

The base is titanium carbide instead of tungsten carbide. Nickel is used as a binder in place of cobalt and molybdenum carbide is used as an alloy carbide addition.

Good Wear Resistance

The tungsten free grades are characterized by high wear resistance and the cratering action of steel chips is greatly reduced. Tool life is excellent on steady finishing cuts, particularly when high speeds and fine feeds are employed in machining hard abrasive steels.



NOW- A Quick, Easy-to-Use Guide to Efficient Machining

Here's the first simplified system for selecting carbide tool grades. Kennametal's new grade selection method assures top tool performance on every machining job. It's easy to use and eliminates guesswork because grades are grouped according to their wear characteristics (edge-wear and crater-resistant); also according to relative strength with strong, intermediate and hard grades included in each group. These eight Kennametal grades meet all machining requirements.

Kennametal's grading system is unmatched in the industry for simplicity. Any experienced machinist can use it to quickly adjust grades for better tool performance. For example: If K3H is being used and crater is no problem, a switch to K4H, which is more edge-wear resistant, will provide longer tool life. Conversely, if K4H is being used and crater is excessive, a switch to K3H would improve tool life.

Your Kennametal representative will gladly help you apply this grade selection system to your machining operations. He can also help apply these eight grades to "wear spots" in your product, your processing lines, or any place a hard, wear-resistant metal is needed. Just give him a call. Kennametal Inc., Latrobe, Pa.

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KENNAMETAL*
CEMENTED CARBIDE TOOLING
THAT INCREASES PRODUCTIVITY

SALES OFFICES IN PRINCIPAL CITIES

A-18

NEW EQUIPMENT

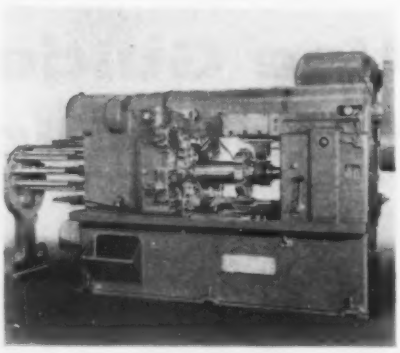
New and improved production ideas, equipment, services and methods described here offer production economies . . . for more data use the free postcard on page 121 or 122

Shell mold manufacture using metal pattern

Gee shell and core making machine is designed to use any metal pattern which will not disintegrate at the desired operating temperature. Shells and cores can be made simultaneously when necessary, as long as the patterns and core boxes will fit under the dump box. Shell size is controlled to the exact size of the mold. The operator can repair visible shell defects while they are on the machine. Model SC-1418 accommodates any pattern up to 14 x 18 in. which requires a stripping action to 6 in. It also accommodates a core box with 14 x 18-in. base, and a height 6 in. above the rollover frame. *Metco Processing Corp.* and *Gladwin Corp.*

For more data circle No. 33 on postcard, p. 121.

New facilities individualize new Conomatic Eight



A 1⅝ in. Model VE Conomatic Eight has many of the better qualities of previous Conomatic Eights and Sixes. Some features individualize the machine: a stronger machine frame with support for work requiring a motor drive between 30 and 60 hp; larger diameter power transmission shafts and bearings; a tooling area 12 in. longer than Model VB; accommodation for the heavier and larger type of tool and attachment heads required for the use of carbide tipped tools; a two-train change gear range of 42 work spindle speeds from 125 to 2470 rpm. Five standard, independently actuated, box type, main cross slides afford seven tooling positions. *Cone Automatic Machine Co., Inc.*

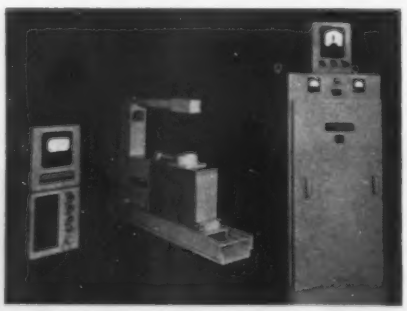
For more data circle No. 34 on postcard, p. 121.

Roller features quicker, easier starting of loads

Fifty per cent less manpower is said to be required to push a palletized load between work stations along a level conveyor line with the new 3½-in. diam rollers than with 2½-in. rollers. Because of its design, inertia of the roller at rest is more easily overcome. As a result, quicker and easier starting of loads is assured and less pitch or incline is required with gravity lines. The rollers are fabricated of nine-gage steel tubing, have 11/16 in. hexagon axles and are regularly mounted in a 4-in. structural steel channel frame; are available in 5- and 6-in. channel frames. Load rating per roller is 1000 lb on level lines, 730 lb on gravity lines. *E. W. Buschman Co.*

For more data circle No. 35 on postcard, p. 121.

Automatic strip thickness control for sheet mills



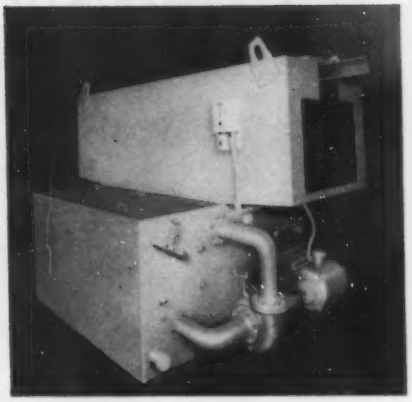
New device automatically regulates the thickness of metallic strip leaving cold reduction mills. The sizing control operates in conjunction with Sheffield Measuray, and X-ray thickness gage. The operator simply sets the dials on the Measuray control cabinet to the required thickness. Whenever strip thickness varies from that set by the operator, automatic screwdowns on the mill will either raise or lower depending on whether the strip is too thin or too thick. A part of the system includes controls that anticipate whether the screwdowns need adjusting. *Sheffield Corp.*

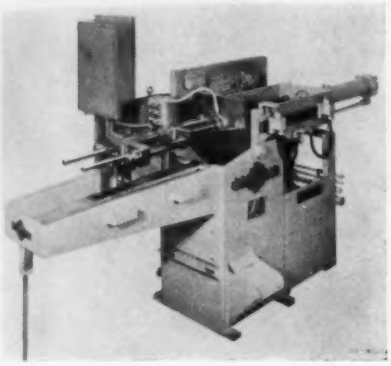
For more data circle No. 36 on postcard, p. 121.

Spray washers can be combined for multistage work

New Series 30, standard unit, monorail-type spray washer can be used as a single unit or combined into a multistage washer to suit the needs of the user. Units can be assembled on the premises, by bolting or welding, and offer a wide variety of combinations. Spray length can be 4 to 10 ft in 2-ft steps. Each washer unit will accommodate work 30 in. wide, with removable baffles to reduce width where operating economy calls for narrower opening. Washer openings range from 24 to 60 in. high in 6-in. steps. Tanks, constructed of 3/16 steel plate with reinforced bottoms, hold 600 to 1000 gal of solution. Spray nozzles are mounted on swing-ells and are adjustable for most effective contour spraying of any surface. Clean design eliminates accumulation of dirt. *Detrex Corp.*

For more data circle No. 37 on postcard, p. 121.





Broaching machine performs 4 basic operations

New horizontal-vertical broaching machine will handle push and pull-down broaching as well as press operations in the vertical position, and in the horizontal position it provides all the advantages of horizontal broaching. The Colonial 4 was developed to perform efficiently and economically as a utility and straight production machine; for long and short runs. Horizontal and vertical positions of the working bed are obtained by pivoting the bed section about the top of the base by means of a hydraulic lift cylinder. In the horizontal position the rated capacity is 6 tons; height to center line of broach is 44 in. Rated capacity in the vertical position is 8 tons. *Colonial Broach Co.*

For more data circle No. 38 on postcard, p. 121.

New scales determine cylindrical surface roughness

New cylindrical surface roughness scales are designed as a standard of comparison by sight and touch for internal and external curved surfaces. Consisting of two scales each, 6 in. wide x 2 in. long, the set is suited for determining the roughness of surfaces produced by grinding, lapping, honing, superfinishing, turning, boring, drilling. Surface roughness on both scales is specified by numbers stamped on the units' sides which represent the arithmetic average deviation from the mean surface in microinches. The scales provide a standard objective reference by which engineers and draftsmen can designate the roughness and appearance of numerous finishes required for functional purposes; can help determine process procedures. *General Electric Co.*

For more data circle No. 39 on postcard, p. 121.

Shaper cuts teeth on large coarse pitch gears

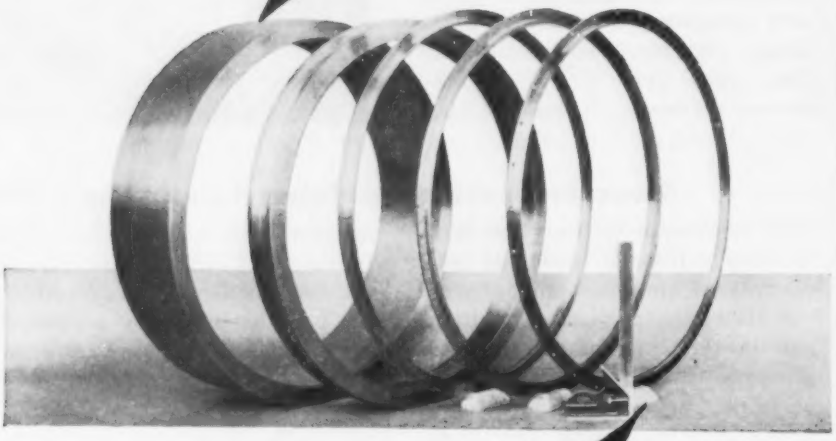
Heavy-duty gear shaper added to the Shear-Speed line is especially designed for cutting the teeth on large coarse pitch gears. With Shear-Speed shapers all the teeth in a gear, special cam, ratchet, and other special forms are cut simultaneously by reciprocating the gear blank through the cutting head and infeeding the form cutting tools. Model 18105-HD cuts gears having maximum pitch of 3. Working components of the machine have extremely high rigidity and strength to absorb high cutting loads. Feed and relief controls and tool sharpening compensation adjustment are located on the vertical centerline of the head and cutting tools. This permits the entire head assembly to be contained in a compact, and therefore more rigid, housing. The heavy-duty model will cut gears having face widths up to 4½ in. It has a 5-in. stroke and will shape gears with diameters ranging from 5 to 10 in. *Michigan Tool Co.*

For more data circle No. 40 on postcard, p. 121.

Turn Page

DURASPUN

CENTRIFUGALLY CAST by DURALOY



CUT and FINISHED by THE CUSTOMER

High Alloy rings for jet engines . . . we did the casting and rough finishing and the customer did the cutting and final finishing.

Centrifugally cast metal gives an exceptionally fine, dense, uniform grain structure. The strength of the metal approaches that imparted to a bar or ingot when it is hot forged. It produces an ideal metal for the tough service required of jet engine parts.

Incidentally, as evidence of our knowledge of and experience with tough alloy castings — static as well as centrifugal — the records show very few rejections by this engine manufacturer who subjected each of the many rings we furnished to his own very rigid tests.

May we suggest that you let Duraloy work on your high alloy castings — chrome iron, chrome nickel or nickel chrome? We have the experience and facilities for turning out high quality castings.

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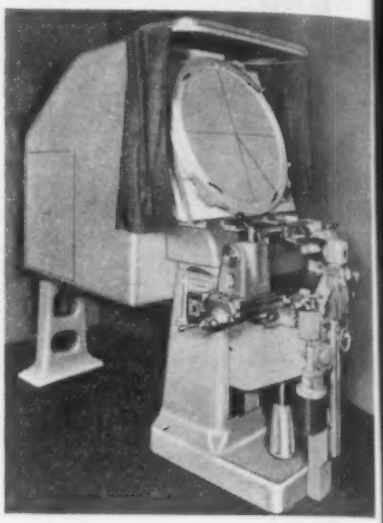
Optical comparator

A special 30-in. screen optical comparator for inspecting very heavy parts is built to rigid machine tool standards with a milling machine base and table. A maximum of 12 in. diam x 20 in. length may be held between centers on a 42-in. table. A 32-in. table is available. Horizontal measurement is 16 in., vertical, 6 in. Electrically controlled power elevation is added to increase ease of operation. Standard projection lenses from 10 to 100 magnifications are used according to job specifications. Ample clearance for loading and unloading by crane is provided. *Jones & Lamson Machine Co.*



For more data circle No. 41 on postcard, p. 121.

Reduces milling costs

Model No. 28 ram-type milling machine features adjustable cutterhead and movable ram which offer the user greater opportunities to reduce milling costs, simplify milling operations and increase production. The new heavy duty adjustable cutterhead permits conventional horizontal and vertical, plus angular milling on one machine. Head is adjustable from 0 to 90° for easy, accurate positioning. Rugged extended ram permits maximum cuts within its entire ram range to the full capacity of the motor. Van Norman speed and feed selectors provide quick, easy selection of 12 speeds and 18 feeds. *Van Norman Co.*

For more data circle No. 42 on postcard, p. 121.

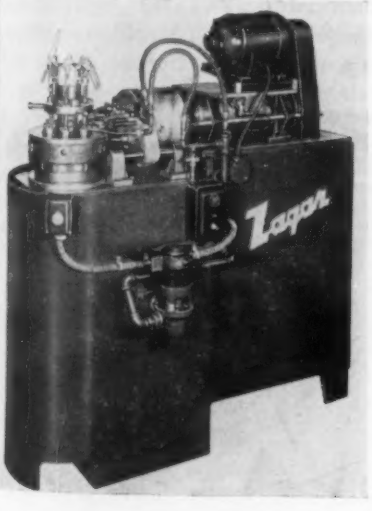
Metal stop

Metallizing efficiency is reportedly improved with new Metal Stop. The product has a distinct gray-white color which readily shows up the part area to be protected. Its edge aligning is sharp and it is a fast drying paint. Brushing is made easier with Metal Stop because of its free flowing characteristics. Because it is water soluble, brush cleaning is no problem. It provides a smooth, even coating and is said to leave no streaks or unprotected areas. The product is packed 6 quarts to a case. *Park Chemical Co.*

For more data circle No. 43 on postcard, p. 121.

Basic units

A series of machines for special purposes use standard Zagar components: a hydraulic feed unit and a gearless drill head. The feed unit includes a base which serves as a table for the manually operated six-station indexing fixture. While three stations are at drilling position, the remaining three



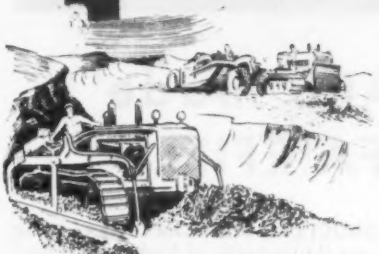
are open for loading and unloading. All Zagar drilling machines are built to standards set by J.I.C. Feed units and drill heads are removable and can be used for other jobs with tooling changes. A basic tank is included with every unit. All feed units operate hydraulically. *Zagar Tool, Inc.*

For more data circle No. 44 on postcard, p. 121.

Turn Page

For DEPENDABILITY

ERIE the correct fastener for the job!



Erie Fasteners are in wide use by the nation's leading builders of Construction Equipment.

You can rely on over 40 years of experience in producing bolts, studs and nuts designed to withstand the effects of high and low temperatures, high stresses, fatigue and corrosion. Modern facilities enable our skilled craftsmen to produce to your specifications bolts, studs and nuts, precision machined and heat treated in carbon, alloy, stainless steel and non ferrous metals.

These Erie Products prove their quality every day in the railroad, chemical, petroleum and automotive industries; on farm, construction and industrial equipment and heavy machinery. Send your design and material specifications to us . . . we will make for you the Correct Fastener for the Job.

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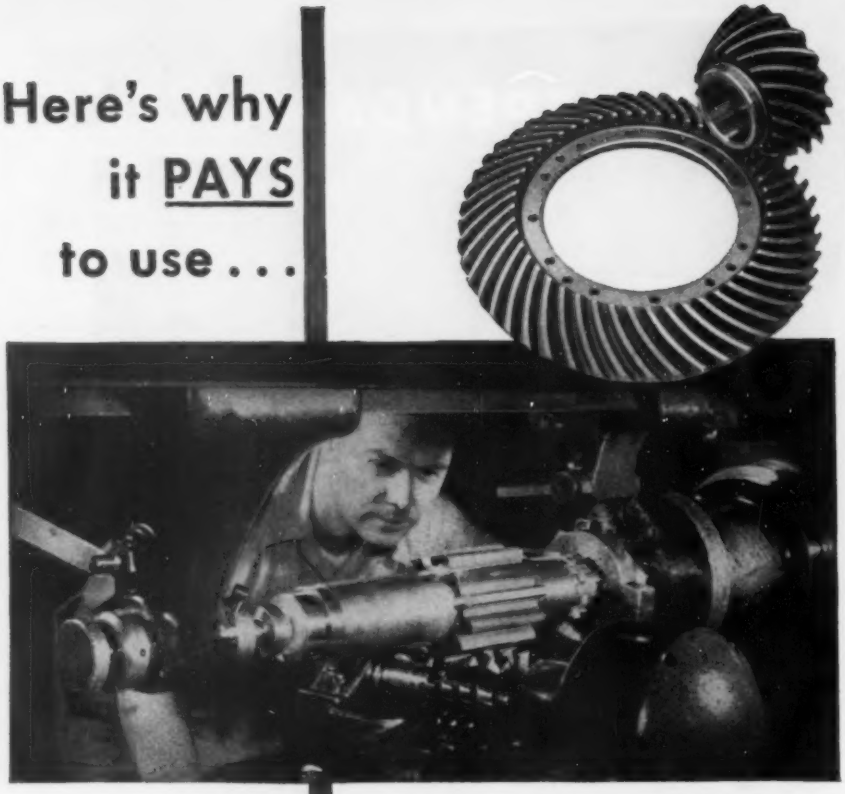
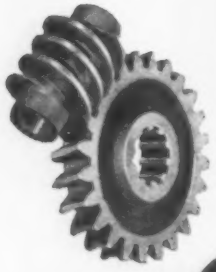
STUDS • BOLTS • NUTS
ALLOYS • STAINLESS
CARBON • BRONZE

Representatives in Principal Cities.

Here's why it PAYS to use . . .





GEARS made by FAIRFIELD

MASS PRODUCTION ECONOMY— Large or small, you get the benefits of high production rates and big volume output at FAIRFIELD— the place where fine gears are produced to meet your specifications EFFICIENTLY, ECONOMICALLY!

QUALITY PLUS—There is no finer recommendation for the quality of the product you sell than to be able to say that it is "EQUIPPED WITH FAIRFIELD GEARS!"

DEPENDABLE SOURCE OF SUPPLY— Supplier of precision-made, automotive type gears for over thirty years to leading builders of construction, agricultural, industrial, marine, and automotive equipment.

COMPLETE PRODUCTION FACILITIES—Unexcelled facilities in a new and ultramodern plant for producing Spur, Herringbone, Spiral Bevel, Straight Bevel, Hypoid, Zerol, Worms and Worm Gears, Splined Shafts, and Differentials to your specifications.

ENGINEERING SERVICE — Fairfield engineers are qualified to make expert recommendations on your gear production requirements. Take advantage of the service offered. *Your inquiry will receive prompt attention.*

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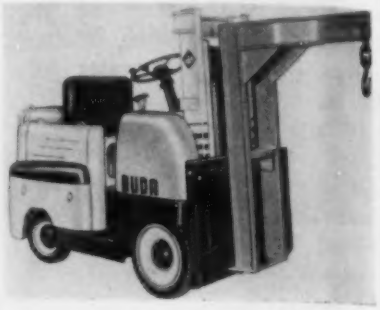
INDIANA

For FINE GEARS

Crane arm

A crane arm attachment for Buda fork lift trucks provides a quick, economical method for handling loads where forks or clamps are not applicable. Crane arms are available in sizes 24, 36, 48, 60, 72 in. and



include such features as: adjustable load center, easy installation; used with or without forks. They are constructed of reinforced channel steel. *Buda Co., Div. of Allis Chalmers Mfg. Co.*

For more data circle No. 45 on postcard, p. 121.

Vertical speed reducers

Shaft-King speed-reduction drives are available for mounting in a vertical position. They are shaft-mounted units for applications where the driven machine shaft is in a vertical position or nearly so.

Can be supplied in 13:1 and 20:1 ratios for requirements through 42 hp. Features include helical gears cut from alloy-steel forgings. A three-wall, internally-ribbed cast iron housing provides permanent gear and gearing alignment. *American Pulley Co.*

For more data circle No. 46 on postcard, p. 121.

Flexible sleeve

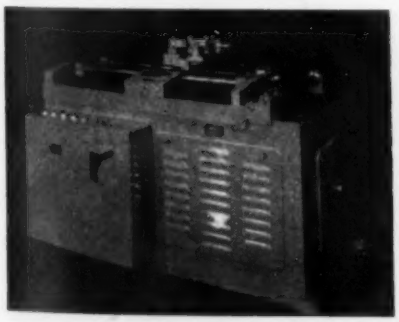
New flexible sleeve with Morse taper permits taper shank drills, reamers, end mills, etc., to be used over and over again regardless of broken or worn tangs. The Pilot is made of spring steel and grips the

tool firmly along the full length of the taper. When fully engaged the sleeve adapts itself to any surface irregularities around the tool and inside the spindle of the machine, making one solid assembly. Only a twist of the wrist is needed to disengage it. Unit comes in sizes 1 to 5 and with Morse tapers from 1:2 to 5:6. *Pilot Tools, Inc.*

For more data circle No. 47 on postcard, p. 121.

Press slide feed

A cabinet-mounted motor-driven slide feed has been added to the line of U. S. Automatic Press Room Equipment. Capacity is for material to 24 in. wide and feeding length is adjustable to maximum 24 in. at



one stroke. Feed lengths over 24 in. be obtained by a counting unit, furnished as part of the equipment. Since the machine is individually motor-driven there are no mechanical connections to the press. The feed can be used with practically any type of press. *U. S. Tool Co., Inc.*

For more data circle No. 48 on postcard, p. 121.

Turn Page

But needle sharp engineering saves her day again

Many a dollar's been turned by offering the housewife something to speed and ease her daily chores. One of the newest and smartest is a throwaway cardboard spool of thread. It replaces the bottom bobbin on her sewing machine — saves her from transferring thread from old-type wooden spools. Now, to change colors, she merely changes the cardboard spool.

Taft-Peirce engineers helped to design and build the machines that wind the thread on the cardboard spools. They wind it, cut it off at the proper length, and tuck the end underneath to secure it.

Creative engineering and manufacturing like this is the principal product of the Taft-Peirce Contract Division. Name your manufacturing problem — we can usually find a money-saving solution, and will design it, tool it, make it, test it, ship it. Interested? Just send for a copy of our 92 page illustrated booklet, "Take It To Taft-Peirce."

T P

For
Engineering
Tooling
Contract Manufacturing

TAKE IT TO TAFT-PEIRCE

The Taft-Peirce Manufacturing Co., Woonsocket, R. I.

TELEPHONE, WOONSOCKET 1

An-cor-lox *Lock Nuts*
all purpose LOCK NUTS

makes good equipment better

ALL METAL—Withstand vibration, shock, high temperatures, corrosive conditions.
SELF CONTAINED—No assembling of the lock nut before using.
LOCK TIGHTER—Conditions of vibration improve the locking power. There is no need to replace An-cor-lox lock nuts after use.
STANDARD BOLTS—An-cor-lox lock nut dimensions conform to standards for plain nuts . . . threads conform to national form.
CONVENTIONAL WRENCHES—No special tools are required to apply An-cor-lox lock nuts.
SCREWS ON EASILY—Like an ordinary nut until it is locked in position.

AN-COR-LOX DIVISION
641 PINE STREET ELIZABETH, N. J.

Like to speed up your reading?

Turn to pages 2 and 3 of The Iron Age every week and let the

Digest of the Week in Metalworking

help you find your favorite features.

IT PAYS TO READ IRON AGE ADS TOO!

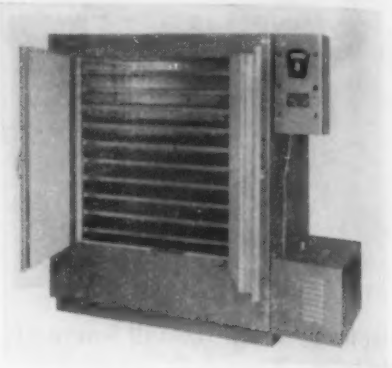
NEED COMPONENT PARTS FOR YOUR PRODUCT?

Find the plant which can supply them in the

CONTRACT MANUFACTURING SECTION

Recirculating oven

New electric recirculating oven provides a maximum temperature of 650°F. Open type elements are located in the bottom of the oven, and the air is recirculated by one or two stainless steel blowers, depending



upon the size. Motor to drive the blowers is installed in an easily accessible ventilated cabinet. The oven can be built in many sizes, with any type temperature control desired. *K. H. Huppert Co.*

For more data circle No. 49 on postcard, p. 121.

Tandem-type Speed Nuts

Reductions in assembly time and materials handling are possible with new flat tandem-type Speed Nuts. They are produced in coil or strip form with a partial shear between each nut for fast, simple detachment. These fasteners-with-a-handle completely eliminate pro-

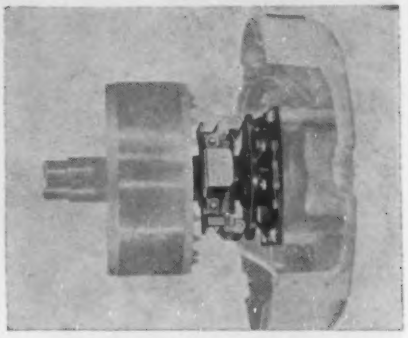
duction line slowdowns due to dropped or misplaced parts. Designed for making power-driven attachments with type A or B (Z) sheet metal screws, the new production-accelerating fasteners are easy to hold, easy to use and they provide double-locking, vibration-free attachments. *Tinnerman Products, Inc.*

For more data circle No. 50 on postcard, p. 121.

Integral switch provides automatic reversal

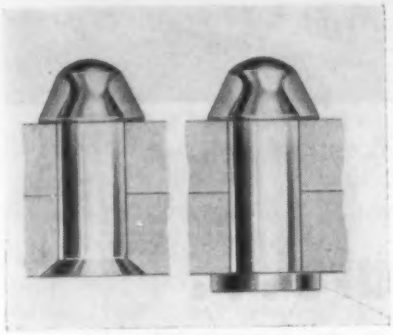
New development makes the reversibility of fractional hp single phase electric motors completely automatic. A reversing switch integrated with a starting switch permits the motor to reverse the direction of rotation each time the motor is turned on. The switch replaces the conventional type starter switch and eliminates the need of external relay circuits. The switch will also automatically reverse the direction of rotation whenever an unusual overload condition occurs. It disconnects the starting winding of the motor when rated rpm is reached. *In-Sink-Erator Mfg. Co.*

For more data circle No. 51 on postcard, p. 121.



Titanium rivets

Weight saving of 40 pct over alloy steel Hi-Shears is claimed for new Hi-Shear rivets in titanium. They have a minimum shear strength of 95,000 psi; retain useful strength at elevated temperatures from 800° to 1800°F. They have excellent corrosion resistance; are completely unaffected by marine atmospheres and sea water; require no protective finish or lubrication. *Pheoll Mfg. Co.*



For more data circle No. 52 on postcard, p. 121.

Overrunning clutches

New line of extra heavy duty cam clutches for indexing, backstop and general duty machinery applications is available. Called the K series, these clutches embody many of the design features of the former Kelpo overrunning clutches. Tapped holes are provided in both ends for attaching sprockets, gears, pulleys or ratchet arms for drive requirements from 1300 to 6000 ft-lb. Desired direction of rotation is easily obtained by attaching the component to either side of the clutches. Series K clutches are made in four standard sizes. Each has made-to-order bore and keyway sizes. Typical drive applications include dual drives, 2-speed drives, and fan drives. *Morse Chain Co.*

For more data circle No. 53 on postcard, p. 121.

Cowles

DRYORTH*

Anhydrous Sodium Orthosilicate

High-powered Cleaning at Low Cost

• Cowles DRYORTH is free-flowing, granular, dust-free. It contains not less than 60% Na_2O and is quickly and completely soluble.

DRYORTH is a fast, economical cleaner for

★ strip and sheet steel
★ steel pipe — before galvanizing
★ heavy ferrous parts and castings

Try DRYORTH for these and other basic cleaning operations. DRYORTH — anhydrous sodium orthosilicate — assures long cleaning mileage at low cost.

*Reg. U. S. Pat. Off.

Cowles also manufactures a complete line of cleaners engineered to handle all kinds of cleaning problems on both ferrous and non-ferrous metals. The Cowles Technical Man in your area will be glad to discuss any metal cleaning problems you have. Write us today!

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Safety Plate... Quick Delivery

The Famous Inland 4-Way Design

The next time you're looking for an answer to an under-foot problem where sure traction, easy maintenance and long wear are important, call Ryerson for Inland 4-Way Safety Plate.

The lugs in this attractive Inland pattern are hot rolled at right angles to each other to provide safe footing in all directions. There are no pockets where liquid or dirt can collect, so the surface is easy to drain and sweep.

This firesafe, long-lasting plate is available in two pattern sizes and a wide range of thicknesses. You can order it sheared, bent or punched to your specifications. Our stocks are complete—and we can assure you of immediate shipment.

PRINCIPAL PRODUCTS: CARBON, ALLOY & STAINLESS STEELS—BARS, STRUCTURALS, PLATES, SHEETS, TUBING, MACHINERY & TOOLS, ETC.

RYERSON STEEL

JOSEPH T. RYERSON & SON, INC. PLANTS AT: NEW YORK • BOSTON • PHILADELPHIA • CINCINNATI • CLEVELAND • DETROIT
PITTSBURGH • BUFFALO • CHICAGO • MILWAUKEE • ST. LOUIS • LOS ANGELES • SAN FRANCISCO • SPOKANE • SEATTLE

The Iron Age SUMMARY . . .

This week marks beginning of upturn . . . Don't look for miracles, improvement will be gradual . . . Note increase in new orders.

Upturn . . . This week marks the beginning of the long-awaited upturn in the steel market. There is a modest increase in new orders. And production is scheduled slightly higher for the second week in a row. With the possible exception of the Labor Day week, the market should continue to improve gradually.

The most significant thing about the upturn is that it has been achieved without the stimulus everyone has been waiting for—renewed steel buying by the auto industry for new models. When that happens it will furnish more strength to an already recovering patient.

Outlook . . . Still, there is no reason to expect that improvement will be spectacular or sudden. It may actually be so slow as to be barely discernible from week to week. But within the next 2 months or so the ingot rate should climb about 10 points.

Evidence . . . Here are the signs that tell us the steel market has turned the corner and is headed up:

(1) Several steel companies have noticed a slight increase in both tonnage and number of new orders. The ones not reporting an increase at least do not report business any worse.

(2) Inventory correction, which had been a depressing factor for many months, is leveling off. Except for warehouses, steel mill customers generally have their stocks whittled to desired size.

(3) Plant-wide shutdowns of steel consumers for vacations are virtually completed.

(4) Warehouse sales, a fairly reliable barometer of business at mill level, are up substantially. Warehousemen are now confident their sales will continue to improve.

(5) Improvement is fairly general, not confined to a few items or companies. It is noted in some of the products that had been lagging most, such as stainless steels and carbon bars.

Delivery . . . Despite reduced inventories, customers can now get such prompt delivery that they are in no hurry to place orders. Delivery within 2 weeks can usually be obtained on common sizes of plates, structurals, hot-rolled sheet and strip, hot-rolled bars, some wire products, and at least some cold-rolled strip.

Delivery of tinplate, electrical coils, galvanized sheet, and cold-rolled sheet takes about twice as long. Mills in the Chicago area continue to report stronger demand than producers in most other regions.

Steel Output, Operating Rates

	This Week†	Last Week	Month Ago	Year Ago
Production (Net tons, 000 omitted)	1,544	1,515	1,527	2,140
Ingot Index (1947–49=100)	96.1	94.3	95.1	133.2
Operating Rates				
Chicago	69.0	66.0	70.0	101.0
Pittsburgh	65.0	64.0*	61.0	96.0
Philadelphia	56.0	56.0	56.0	97.5
Valley	64.0	62.0	62.0	94.0
West	77.0	75.5	80.0	98.5
Detroit	74.0	74.0	56.0	104.0
Buffalo	56.5	56.5	56.5	106.5
Cleveland	58.0	54.0	59.0	97.0
Birmingham	69.0	65.0	72.0	97.0
S. Ohio River	74.0	72.0	68.0	68.0
Wheeling	76.0	77.0*	86.0	97.0
St. Louis	56.0	46.5	47.5	94.0
East	47.0	48.0	32.0	79.0
Aggregate	65.0	63.0	64.0	95.5

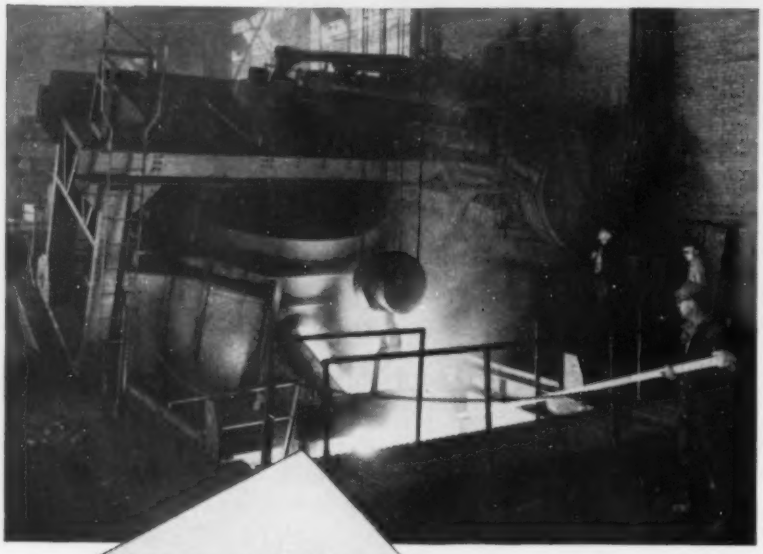
* Revised. † Tentative

Prices At A Glance

(cents per lb unless otherwise noted)

	This Week	Week Ago	Month Ago	Year Ago
Composite prices				
Finished Steel, base	4.801	4.801	4.801	4.634
Pig Iron (gross ton)	$56.59	$56.59	$56.59	$56.76
Scrap, No. 1 hvy (gross ton)	$28.67	$28.67	$27.83	$40.00
Nonferrous				
Aluminum, ingot	22.20	22.20	21.50	21.50
Copper, electrolytic	30.00	30.00	30.00	29.50
Lead, St. Louis	14.05	13.80	13.80	13.80
Magnesium, ingot	27.75	27.75	27.75	27.00
Nickel, electrolytic	63.08	63.08	63.08	63.08
Tin, Straits, N. Y.	92.75	93.125	95.00	83.50
Zinc, E. St. Louis	11.00	11.00	11.00	11.00

Down go Stainless Costs with IngAclad



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* On stainless side

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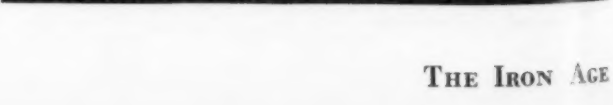


Market Feels an Upward Nudge

September orders presage an upturn . . . Galvanized sheets still going strong . . . Bars soft but showing life . . . Structurals are doing well, plates slow . . . Oil country eases a bit.

• ORDERS now on the books for September delivery give steel producers more than a faint hope that a turn for the better is in the works. A large mill reports that overall volume is definitely up over a month ago and, under present competitive conditions, they can still take orders for September shipment on many products.

Significantly, this upward movement has materialized without too much support from big-time consumers, notably automotive. With the car makers expected to come into the market momentarily for new model requirements, the long-awaited turn around the corner may not be too far off.

Even the stainless steel producers, probably hardest hit by the 1954 slump, are more optimistic. Their order volume has picked up over the last several weeks, particularly in flat-rolled, and some of this business is coming from trim and molding suppliers to the automotive industry.

Change for the better is not pronounced, and no one looks for anything spectacular over the balance of this year. Very few products could be classed as in urgent demand. Even oil country goods, the pace-setter for months, is easier to the extent that consumers are not as frantic as they were.

A midwestern steel company has begun shipping low-phos pig iron from the Cleveland area to Chicago, where it will be stocked and sold to captive foundries.

TINPLATE . . . U. S. Steel Corp. has announced new prices for tin mill products for the 6-month period Oct. 1, 1954 to Mar. 1, 1955. Base prices are raised 10¢ per base box per 100 lb base except Holloware Enameling 29 gage, which is increased 0.10 per lb.

SHEET and STRIP . . . Galvanized still going strong. **Chicago** reports bookings into November; new orders are easing because consumers know they can't get delivery until near year end. All centers report improved demand for stainless flat-rolled, particularly strip. Tinplate appears to be strong in **Chicago** contrary to reports from other areas. Lacking strong demand from automobile manufacturers, appliances, and other heavy consumers, hot- and cold-rolled sheets continue easy. **Detroit** is at low ebb, but one saving feature is that the larger companies have discounted their inventories to offset the September-October slack period during the changeover. Thus they will not drop out of the market as the shift to new models is in process. Hot-rolled sheet in **Chicago** continues to lag, but cold-rolled is in fair shape—4-week delivery **Pittsburgh** and **Cleveland** reflect the Detroit slump.

BARS . . . The market generally is soft, although signs of life are beginning to show here and there. One company reports its sales of hot-rolled bars in **Detroit** are better percentagewise than any other product, but this may be due to a favored position with important consumers. Demand on **West Coast** is fair. Re-bar sales in **East** are up, but prices remain soft; alloy bars are slow; most inventories reported down. In **Chicago**, hot-rolled bars are doing better, but cold-finished is slow.

STRUCTURALS AND PLATE . . . Structural orders for September delivery on **West Coast** are good. In the **East**, highway and turnpike construction is keeping structural market hot, although fabricated competition is keen with even a shipbuilder underbidding regular fabricators on some jobs. **Chicago** reports 2-week delivery with wide-flange slightly longer with some mills allocating; ordering generally is at lower pace as end of construction season approaches. In **Pittsburgh** the structurals market is considered fair. In most centers, the plate market lacks the zip that an upturn in railroad car building would bring. But the wheels are turning happily on the **West Coast**, where refinery and water industries in Southern California are sustaining demand. New water line projects in Los Angeles and Las Vegas, expected to break in next several weeks, have everybody on tenter hooks. The reason, buyers have not decided yet whether to use steel or concrete pipe. If the choice is steel, plate producers will benefit, as one job would require 15,000 to 19,000 tons; the Las Vegas undertaking 20 miles of 8-30-in. diam. pipe.

TUBULAR PRODUCTS . . . Oil country demand still strong, but lacking urgency of prior months; producers look for good market over balance of year. In **Chicago**, the operating rate has slipped in last two weeks and backlog is shrinking, but 4- to 6-week delivery still prevails. **Pittsburgh** mills report merchant pipe demand is good but competitive from delivery standpoint; mechanical tubing market continues easy.

WIRE . . . Market apparently has passed its peak but demand generally is fair. In the **East**, a large producer reports business in August showed improvement over July; consumers are on hand-to-mouth basis; an expected fall pickup has not yet materialized, but one mill looks for 20 pct more business to be booked in September. **Chicago** reports a tentative pickup in industrial grades; farm market continues good. In **Pittsburgh** manufacturers' wire holds firm, but merchant wire is off seasonally; construction projects, strong for some months, looks as though it will be off in fourth quarter. **Cleveland** looks for a pickup when automotive buying is resumed.

Purchasing Agent's Checklist

TV CABINETS: Manufacturers switch to steel . . . . . p. 55

WIRE: Welded fabric finds new markets . . . . . p. 56

STAINLESS: Quickening order tempo noted . . . . . p. 57

EXPORTS: More items can be sent to Iron Curtain buyers . . . p. 65

Predict Tight Copper Market

Output lost by strike may mean scarcity in October . . . Users rush to rebuild depleted inventories . . . September supplies sold out . . . Mum on terms—*By R. L. Hatschek.*

◆ NEW HOPE for early settlement of the strike at Kennecott Copper Corp. was good news for copper users, who were caught with low inventories when the walkout came.

Practically all September supplies have been spoken for, and some mines are taking orders for October shipment. But since as much as 20,000 tons may have been lost through the work stoppage, there's a good chance October supplies will be tight. Reflecting the American shortage, copper prices rose in London, although the domestic price here stayed at 30¢ per lb.

Terms of the proposed agreement between Kennecott and International Mine, Mill & Smelter Workers were not announced, but a joint release said they "cover issues common to all four" of the company's properties. At press time, some struck locals had not yet signed, but an early settlement was expected. Terms of the agreement must be ratified by the affected locals. No end to the Chilean strike is in sight.

Latest development in Kaiser Aluminum & Chemical Corp.'s series of expansion programs is construction of a new aluminum sheet and foil rolling mill near Ravenswood, W. Va.

Capacity of the initial facility to be completed by mid-1956 will be 36,000 tons of light-gage aluminum sheet and foil. Heavy-gage re-roll stock will be supplied from Kaiser's Trentwood, Wash., plant.

In the second phase of construction the new plant will be a fully integrated rolling mill with an annual capacity in excess of 125,000 tons, will process aluminum pig from Kaiser's Chalmette plant at New Orleans.

The new plant will be the company's third fabricating facility in the East-Midwest area. Others: the Newark, Ohio, rod, bar and electrical conductor plant and the Halethorpe, Md., extrusion plant.

COPPER . . . Expectation of early end of Kennecott strike saw copper users rushing to rebuild depleted inventories, low when the stoppage began. Domestic price stayed firm last week in the face of an increase in London, but higher prices may follow settlement and ordering flurry. At press time it was not yet apparent, although expected scarcity in October was a good argument in its favor.

Reflecting vacation shutdowns of brass and bronze ingot consumers, shipments in July totaled only 17,074 tons. This is a 5000-ton plus drop from June's 22,348 tons and compares with a June-July decline last year of only about 1500 tons.

LEAD . . . Several interrelated factors last week combined to give lead prices a boost of 0.25¢ per lb. This brought the St. Louis quotation to 14.05¢ and the New York figure to 14.25¢ per lb.

President Eisenhower's rejection of higher tariffs and announcement of the steps the government would take to shore up the industry (See THE IRON AGE, Aug. 26, p. 136) were first—followed shortly by rising prices in London. And demand felt a jolt that sent sales up last week by 10 to 15 pct.

Following the U. S. price hike and a slight easing in London the following day, the London price was still a shade higher than its New York equivalent. It was also noted in the trade that demand continues good after the increase.

ZINC . . . More or less in sympathy with lead, zinc demand turned brighter last week—but it was brief. The flurry died away quickly, leaving demand about where it had been.

In line with the President's proposals, various government agencies are now busy mapping out the details of the new program. A number of questions have been raised on details, especially in connection with the supplementary stockpile which is to be of foreign metal acquired through trade with farm surplus products.

National Lead & Zinc Committee said last week it still favored an "anti-dumping tariff." The organization, however, agrees that President Eisenhower's plan should bolster the markets and result in higher prices.

ALUMINUM . . . Shipping costs in the far-flung aluminum industry are no minor item with major ore sources in the Caribbean and the necessity of locating reduction plants where cheap electricity is available in big quantities. One way the industry is chipping away at freight is by putting its finishing facilities near the heart of the big markets. An example of this is Kaiser Aluminum's latest expansion plan.

Daily Nonferrous Metal Prices

(Cents per lb except as noted)

	Aug. 25	Aug. 26	Aug. 27	Aug. 28	Aug. 30	Aug. 31
Copper, electro, Conn.	30.00	30.00	30.00	30.00	30.00	30.00
Copper, Lake, delivered	30.00	30.00	30.00	30.00	30.00	30.00
Tin, Straits, New York	93.25	93.125	93.125	....	92.75	92.75*
Zinc, East St. Louis	11.00	11.00	11.00	11.00	11.00	11.00
Lead, St. Louis	14.05	14.05	14.05	14.05	14.05	14.05

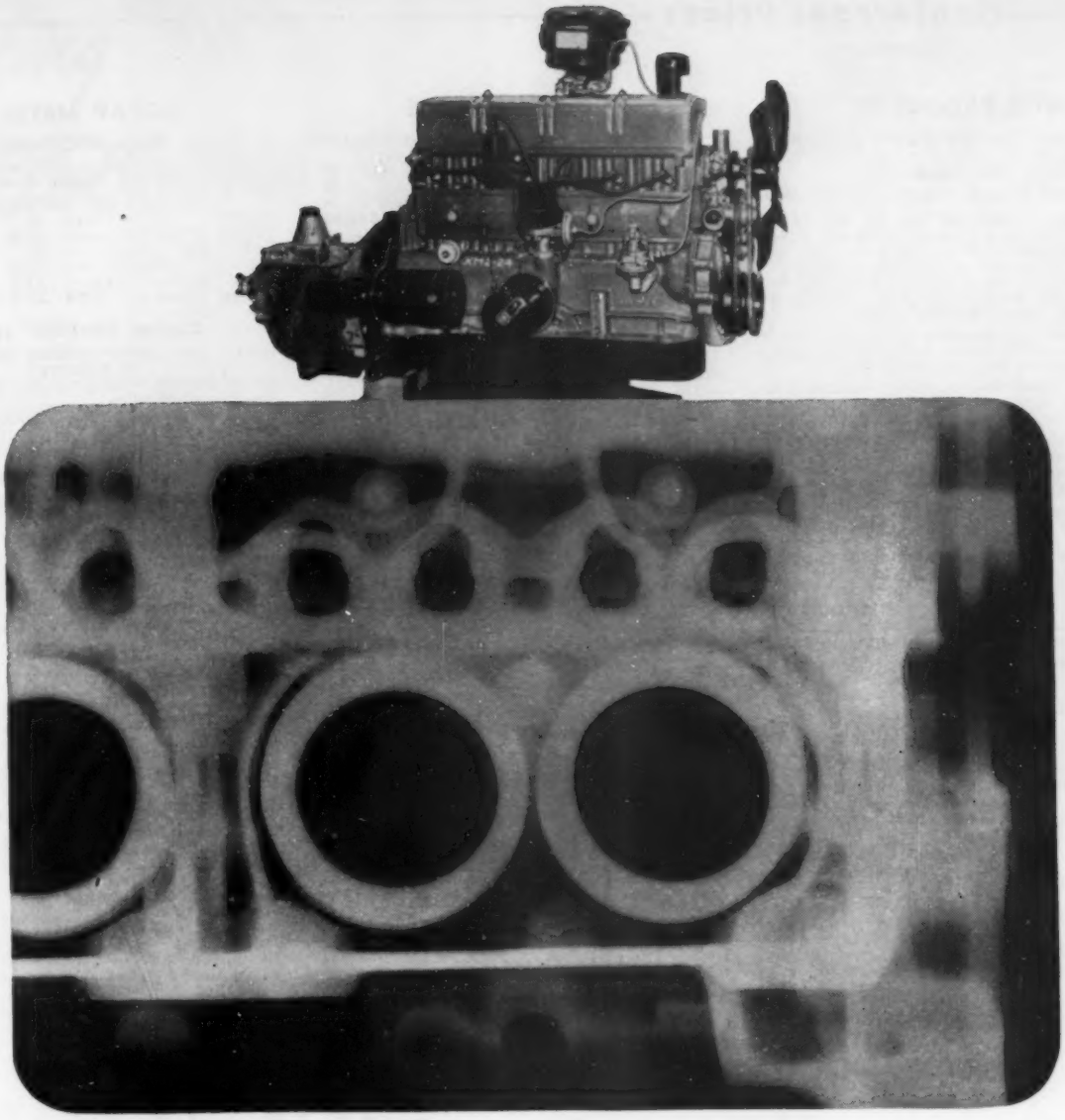
Note: Quotations are going prices **Tentative*

Monthly Average Metal Prices

(Cents per lb except as noted)

Average prices of the major nonferrous metals in August, based on quotations appearing in THE IRON AGE, were as follows:

Electrolytic copper, Del'd Conn. Valley	30.00	Zinc, E. St. Louis	11.00
		Zinc, New York	11.50
Lake copper, delivered	30.00	Lead, St. Louis	13.858
Straits tin, New York	93.386	Lead, New York	14.058



Production line "bugs" get X-RAYED out on the pilot model

MASS production of car engines calls for a continuous run of castings as uniformly sound as it's possible to pour. No sand holes. No gas holes. No core shifts.

Manufacturers take care of that early in their plans. They radiograph pilot castings—can spot thin walls, "out-of-rounds," and other irregularities which a change in casting procedure can forestall.

Improving yield is one of the reasons more and more foundries are making radiography routine. It is the one way to be sure only high-quality work is released.

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Nonferrous Prices

(Effective Aug. 31, 1954)

MILL PRODUCTS

(Cents per lb, unless otherwise noted)

Aluminum

(Base 30,000 lb. f.o.b. ship. pt., frt. allowed)

Flat Sheet: 0.136-0.249 in, 2S, 3S, 34.9¢; 4S, 37.1¢; 52S, 39.2¢; 24S-O, 24S-OAL, 38.3¢; 75 S-O, 75S-OAL, 45.8¢; 0.081 in., 2S, 3S, 36.1¢; 4S, 38.8¢; 52S, 40.9¢; 24S-O, 24S-OAL, 39.8¢; 75S-O, 75S-OAL, 48.1¢; 0.032 in., 2S, 3S, 38.1¢; 4S, 43.0¢; 52S, 45.7¢; 24S-O, 24S-OAL, 48.4¢; 75S-O, 75S-OAL, 59.8¢.

Plate, ¼-in. and heavier: 2S-F, 3S-F, 33.6¢; 4S-F, 35.7¢; 52S-F, 37.4¢; 61S-O, 36.8¢; 24S-O, 24S-OAL, 38.4¢; 75S, 75S-OAL, 45.8¢.

Extruded Solid Shapes: Shape factors 1 to 5, 37.7¢ to 85.7¢; 12 to 14, 38.4¢ to $1.03; 24 to 26, 41.2¢ to $1.34; 36 to 38, 48.8¢ to $1.96.

Rod, Round: Rolled, 1.064-4.5 in., 2S-F, 42.6¢ to 39.1¢; cold finished, 0.375-3.499 in., 2S-F, 46.9¢ to 41.4¢.

Screw Machine Stock: Rounds, 11S-T3, ⅛-11/32 in., 62.5¢ to 49.1¢; ⅜-1½ in., 48.9¢ to 45.9¢; 1 9/16-3 in., 44.7¢ to 41.7¢. Base 5000 lb.

Drawn Wire: Coiled, 0.051-0.374 in., 2S, 46.1¢ to 34.8¢; 52S, 55.7¢ to 43.4¢; 17S-T4, 63.3¢ to 43.7¢; 61S-T4, 58.5¢ to 43.1¢.

Extruded Tubing: Rounds, 63S-T5, OD 1¼-2 in., 43.4¢ to 63.8¢; 2-4 in., 39.3¢ to 53.6¢; 4-6 in., 39.8¢ to 48.8¢; 6-9 in., 40.4¢ to 51.1¢.

Roofing Sheet: Flat, per sheet, 0.032-in. 42¾ x 60-in., $2.918; x 96-in., $4.672; x 120-in., $5.841; x 144-in., $7.009. Coiled sheet, per lb, 0.019 in. x 28 in., 29.9¢.

Magnesium

(F.o.b. mill, freight allowed)

Sheet & Plate: FS1-O ¼ in., 56¢; 3/16 in., 57¢; ⅛ in., 60¢ 0.064 in., 73¢; 0.032 in., 94¢. Specification grade higher. Base 30,000 lb.

Extruded Round Rod: M, diam ¼ to 0.311 in., 77¢; ⅜ to ¾ in., 60.5¢; 1¼ to 1.749 in., 56¢; 2⅛ to 5 in., 51.5¢; Other alloys higher. Base up to ¾ in. diam, 10,000 lb; ¾ to 2 in., 20,000 lb; 2 in. and larger, 30,000 lb.

Extruded Solid Shapes: Rectangles: M. In weight per ft, for perimeters less than size indicated; 0.10 to 0.11 lb, 2.5 in., 65.3¢; 0.22 to 0.25 lb, 5.9 in., 62.3¢; 0.50 to 0.59 lb, 8.6 in., 59.7¢; 1.8 to 2.59 lb, 19.5 in., 56.8¢; 4 to 6 lb, 28 in., 52¢. Other alloys higher. Base, in weight per ft of shape: Up to ⅛ lb, 10,000 lb; ⅛ to 1.80 lb, 20,000 lb; 1.80 lb and heavier, 30,000 lb.

Extruded Round Tubing: M, 0.049 to 0.057 in. wall thickness: OD, ¼ to 5/16 in., $1.43; 5/16 to ⅜ in., $1.29; ½ to ⅝ in., 96¢; 1 to 2 in., 79¢; 0.165 to 0.219 in. wall; OD, ⅝ to ¾ in., 64¢; 1 to 2 in., 60¢; 3 to 4 in., 59¢. Other alloys higher. Base, OD: Up to 1½ in., 10,000 lb; 1¼ to 3 in., 20,000 lb; over 3 in., 30,000 lb.

Titanium

(10,000 lb base, f.o.b. mill)

Commercially pure and alloy grades; Sheets and strip, HR or CR, $15; Plate, HR, $12; Wire, rolled and/or drawn, $11; Bar, HR or forged, $6; Forgings, $6.

Nickel, Monel, Inconel

(Base prices, f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	86½	67½	92½
Strip, CR	92½	70½	98½
Rod, bar	82½	65½	88½
Angles, HR	82½	65½	88½
Plate, HR	84½	66½	90½
Seamless tube	115½	100½	137½
Shot, blocks	....	60	....

Copper, Brass, Bronze

(Freight included on 500 lb)

	Sheet	Rods	Extruded Shapes
Copper	46.41	....	48.48
Copper, h-r	48.38	44.73	....
Copper, drawn	....	45.98	....
Low brass	44.47	44.41	....
Yellow brass	41.72	41.66	....
Red brass	45.44	45.38	....
Naval brass	45.76	40.07	....
Leaded brass	....	....	39.11
Com. bronze	46.95	46.89	....
Mang. bronze	49.48	43.62	45.18
Phos. bronze	66.58	67.08	....
Muntz metal	43.96	39.77	41.02
Ni silver, 10 pct	55.36	....	62.63

Beryllium copper, CR, 1.9% Be, Base 2000 lb, f.o.b.
- Strip $1.68
- Rod, bar, wire 1.65

PRIMARY METALS

(Cents per lb, unless otherwise noted)

- Aluminum ingot, 99+%, 10,000 lb, freight allowed 22.20
- Aluminum pig 20.50
- Antimony, American, Laredo, Tex. 28.50
- Beryllium copper, per lb conta'd be. $40.00
- Beryllium aluminum 5% Be, Dollars per lb contained Be $72.75
- Bismuth, ton lots $2.25
- Cadmium, del'd $1.70
- Cobalt, 97-99% (per lb) ..... $2.60 to $2.67
- Copper, electro, Conn. Valley 30.00
- Copper, Lake, delivered 30.00
- Gold, U. S. Treas., per troy oz. $35.00
- Indium, 99.8%, dollars per troy oz. $2.25
- Iridium, dollars per troy oz. $165 to $175
- Lead, St. Louis 14.05
- Lead, New York 14.25
- Magnesium, 99.8+%, f.o.b. Freeport, Tex., 10,000 lb, pig 27.00
- ingot 27.75
- Magnesium, sticks, 100 to 500 lb, 46.00 to 48.00
- Mercury, dollars per 76-lb flask, f.o.b. New York ..... $290 to $293
- Nickel electro, f.o.b. N. Y. warehouse 63.08
- Nickel oxide sinter, at Copper Creek, Ont., contained nickel 56.25
- Palladium, dollars per troy oz. $21.00
- Platinum, dollars per troy oz. $84 to $87
- Silver, New York, cents per troy oz. 85.25
- Tin, New York 92.75
- Titanium, sponge, grade A-1 ..... $4.72
- Zinc East St. Louis 11.00
- Zinc New York 11.50
- Zirconium copper, 50 pct $6.20

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

- 85-5-5-5 ingot
  - No. 115 ..... 27.00-28.50
  - No. 120 ..... 26.25-27.75
  - No. 123 ..... 25.75-27.25
- 80-10-10 ingot
  - No. 305 ..... 31.50-33.00
  - No. 315 ..... 29.25-30.75
- 88-10-2 ingot
  - No. 210 ..... 41.25-41.75
  - No. 215 ..... 37.75-38.25
  - No. 245 ..... 33.25-33.75
- Yellow ingot
  - No. 405 ..... 23.25-24.25
- Manganese bronze
  - No. 421 ..... 26.75

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

- 95-5 aluminum-silicon alloys
  - 0.30 copper, max. 23.50-23.75
  - 0.60 copper, max. 23.25-23.50
- Piston alloys (No. 122 type) 20.50-21.75
- No. 12 alum. (No. 2 grade) 19.75-20.25
- 108 alloy 20.50-20.75
- 195 alloy 20.50-22.00
- 13 alloy (0.60 copper max.) 23.25-23.50
- ASX-679 ..... 20.50-20.75

Steel deoxidizing aluminum, notch-bar granulated or shot

- Grade 1—96-97½% 21.00-21.50
- Grade 2—92-95% 20.00-20.50
- Grade 3—90-92% 19.00-19.50
- Grade 4—85-90% 18.00-18.50

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, freight allowed, 5000 lb lots)

- Copper
  - Cast, oval, 15 in. or longer 42.64
  - Electrodeposited 41.88
  - Flat rolled 45.04
- Brass, 80-20
  - Cast, oval, 15 in. or longer 43.515
  - Zinc, flat cast 20.25
- Ball, anodes 18.50
- Nickel, 99 pct plus
  - Cast 84.00
- Cadmium $1.70
- Silver 999 fine, rolled, 100 oz. lots per troy oz., f.o.b. Bridgeport, Conn. 94⅛

Chemicals

(Cents per lb, f.o.b. shipping points)

- Copper cyanide, 100 lb drum 63.00
- Copper sulfate, 99.5 crystals, bbl. 12.85
- Nickel salts, single or double, 4-100 lb bags, frt. allowed 30.00
- Nickel chloride, 375 lb drum 38.00
- Silver cyanide, 100 oz. lots, per oz. 75½
- Sodium cyanide, 96 pct domestic 200 lb drums 19.25
- Zinc cyanide, 100 lb drum 54.30

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	26	25¼
Yellow brass	19¾	18
Red brass	23	22¼
Comm. bronze	23⅞	23¼
Mang. bronze	18½	17½
Yellow brass rod ends	19½	....

Custom Smelters' Scrap

(Cents per pound carload lots, delivered to refinery)

- No. 1 copper wire ..... 27 —27½
- No. 2 copper wire ..... 25½—25⅝
- Light copper ..... 24 —24½
- *Refinery brass ..... 23 —24

*Dry copper content.

Ingot Makers' Scrap

(Cents per pound carload lots, delivered to refinery)

- No. 1 copper wire ..... 26¾—27
- No. 2 copper wire ..... 25¾—25⅞
- Light copper ..... 23¾—24
- No. 1 composition ..... 21½—22
- No. 1 comp. turnings ..... 20½—21
- Rolled brass ..... 17½—18
- Brass pipe ..... 18½—19
- Radiators ..... 17¾—18¼

Aluminum

- Mixed old cast ..... 13¼—13¾
- Mixed new clips ..... 14 —14¼
- Mixed turnings, dry ..... 13½—14
- Pots and pans ..... 13¼—13¾

Dealers' Scrap

(Dealers' buying price, f.o.b. New York in cents per pound)

Copper and Brass

- No. 1 heavy copper and wire. 24½—25
- No. 2 heavy copper and wire. 23 —23¼
- Light copper ..... 21 —21¼
- New type shell cuttings 20¼
- Auto radiators (unsweated) 15
- No. 1 composition ..... 19 —19¼
- No. 1 composition turnings 18½—19
- Unlined red car boxes 16
- Cocks and faucets ..... 16 —16½
- Mixed heavy yellow brass ... 13
- Old rolled brass 15½
- Brass pipe ..... 16½—17
- New soft brass clippings 16
- Brass rod ends 16
- No. 1 brass rod turnings 15

Aluminum

- Alum. pistons and struts .... 7 — 8
- Aluminum crankcases 10
- 2S aluminum clippings 13
- Old sheet and utensils 10
- Borings and turnings 6
- Misc. cast aluminum 10
- Dural clips (24S) 11

Zinc

- New zinc clippings ..... 6 — 6½
- Old zinc ..... 4¾— 5
- Zinc routings ..... 3 — 3¼
- Old die cast scrap ..... 3 — 3¼

Nickel and Monel

- Pure nickel clippings ..... 60 —65
- Clean nickel turnings 40
- Nickel anodes ..... 60 —65
- Nickel rod ends ..... 60 —65
- New Monel clippings ..... 33 —35
- Clean Monel turnings ..... 16 —18
- Old sheet Monel ..... 21 —23
- Nickel silver clippings, mixed. 15
- Nickel silver turnings, mixed. 13

Lead

- Soft scrap lead ..... 11¼—11½
- Battery plates (dry) ..... 6 — 6¼
- Batteries, acid free 4½

Magnesium

- Segregated solids ..... 18½—19
- Castings ..... 17½—18

Miscellaneous

- Block tin ..... 75 —80
- No. 1 pewter ..... 55 —60
- No. 1 auto babbitt 48
- Mixed common babbitt ..... 12 —12½
- Solder joints 16¼
- Siphon tops 45
- Small foundry type 15⅝
- Monotype 14¾
- Lino. and stereotype 13¼
- Electrotype 11¼
- Hand picked type shells 8¾
- Lino. and stereo. dross 5½
- Electro dross 4.25

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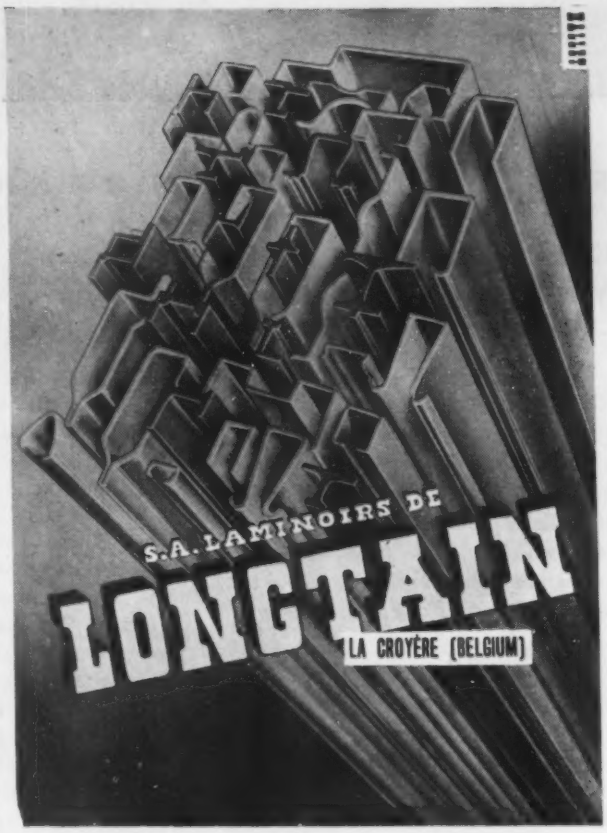

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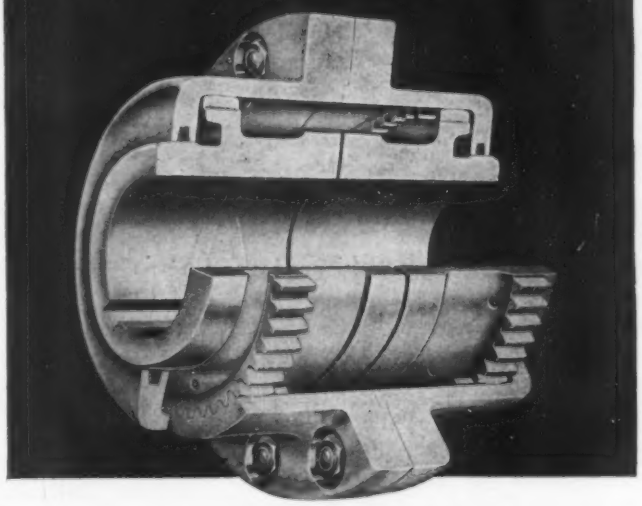

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FLEXIBLE COUPLINGS

POOLE FOUNDRY & MACHINE COMPANY WOODBERRY, BALTIMORE, MD.

Export Bolsters Quiet Market

Little market activity but dealers resist pressure to lower prices . . . Export tightens flow of scrap to Midwest centers . . . Most see uptrend soon . . . Composite holds at $28.67.

◆ DESPITE scattered activity, both buyers and sellers in the ferrous scrap market were generally sitting tight. Mills were reluctant to buy, and dealers and brokers were resisting any pressure to drop prices. In fact they insist in most areas that prices will go up.

Export business continues to dominate and maintain the market in the East, and its repercussions have already reached into Pittsburgh and Birmingham. Flow of material from Northeast into Pittsburgh has been dried up by higher export prices. Southern ports are drawing material from inland, and collections at Birmingham are low. One nearby consumer raised prices $3 on a small tonnage of No. 1 steel.

Prices stubbornly stay up in Chicago, although some scrap veterans are insisting they should dip at least temporarily. In the Cleveland-Youngstown area low summer metalworking and steel operations are shoring up the market through lack of new industrial and home scrap.

Orders are low, but broker-dealer resistance plus low generation kept THE IRON AGE heavy melting Steel Composite pegged at $28.67 per gross ton, again unchanged from the previous week.

Pittsburgh . . . The market is a paradox. Despite little activity, dealers and brokers are reluctant to sell at current prices. Their position is being strengthened by higher prices for automotive lists and export business which has boosted the eastern market, precluding movement from the East into this area. Good scrap is not plentiful, and opinion is general that any new buying will bring higher prices.

Chicago . . . Market continues relatively dull but prices held last week's levels and reports of increasing strength in rail grades continue with little confirmation in advancing consumer delivered prices. An attempt to bear turnings markets had little success at press time. Resistance to falling prices goes right down the line with dealers and collectors holding last week's level. In past weeks a buying lull has been followed almost immediately by a price recession, but thus far this has not been the case. In a few cases at the dealer level there have been at least mild price increases which are completely contrary to the experience of past months.

Philadelphia . . . Export demand continues to be the main factor in this area, and is expected to continue strong through September, perhaps early October. Local mills are still disinterested. Prices are holding at present, but increases appear imminent as soon as local domestic buyers come back into the market in strength. There's no serious pinch on No. 1 material as yet, though pressure will develop if export activity continues as strong as expected.

New York . . . Export business continues to sustain this market, with the biggest problem that of getting enough No. 1 material to cover orders. No. 2 bundles are plentiful, with some mills buying off trucks. Turnings are quiet, cast continues healthy. Prices are unchanged.

Detroit . . . Automotive scrap went at slightly higher prices this month but no orders for dealers' scrap followed immediately to justify a change in prices. Ford Motor Co. unexpectedly threw a large tonnage of bundles on the market. This had a tendency to discourage any higher prices.

Cleveland . . . One Valley area sale of busheling and low phos scrap at prevailing prices was only major activity last week. Elsewhere market continued slow but firm. Tightness on industrial scrap lists is being noted since tonnage generated is down due pricipally to reduced manufacturing activity, largely automotive. Lower available tonnages having firming effect on market for present. Miscellaneous industrial scrap commanding good prices on strength of improved fall market. Foundry buying continues slow.

Birmingham . . . Market here is definitely firmer in tone. The major openhearth consumer so far has held the price line, but the shape of things to come may be forecast by a small (2-carload) purchase by a nearby producer at $3 over the going price.

St. Louis . . . A list of 32 carloads by the St. Louis-San Francisco Railroad last weekend sold readily at present prices, except angles and splice bars which were $3 higher for Birmingham consumption, a price St. Louis factors must meet. Principle item in the railroad lists was 10 cars of No. 1 RR Heavy melting.

Cincinnati . . . Market continues fair with one additional furnace scheduled to be put back in service temporarily this week. Releases by mills to dealers for shipment very slow.

Buffalo . . . Steady tone rules scrap market here as dealers have turned down all leading mills—on orders at lower prices for steelmaking grades. Light supplies are bulling factors. Strength is shown in blast furnace items at the Falls but prices here are unchanged. Boat receipts from Upper Lakes points may be the lowest on record this season.

Boston . . . Lack of demand, especially noted in No. 2 heavy melting steel and No. 2 bundles, has brought New England prices down $2 per ton on these items. Export trading is still going on in the city of Boston, but elsewhere the trade must rely on domestic customers for new business—and there isn't much of it.

West Coast . . . No new activity and no indication, as yet, of any change in mill requirements for September. One small San Francisco mill is still on strike. Cast scrap in Los Angeles is expected to drop $1-$2 during the month, and then level off.

GREAT MOMENTS IN THE HISTORY OF IRON AND STEEL MAKING

This is the third in a series of outstanding inventions and developments that have contributed to the progress of the iron and steel industry.

1740 *Benjamin Huntsman directs the casting of crucible steel ingots.*

Crucible Process for Melting Blister Steel

Until Benjamin Huntsman succeeded in melting and homogenizing blister bar in a crucible, commercial tool steels were undependable. As a result, only a negligible quantity was manufactured. Nevertheless, the crucible process was the first step in the development of fine steels for the manufacture of the strong, sharp, durable tools we know today.

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LEADERS IN IRON AND STEEL SCRAP SINCE 1889

Scrap Prices

(Effective Aug. 31, 1954)

Pittsburgh

No. 1 hvy. melting	$29.00 to $30.00
No. 2 hvy. melting	26.00 to 27.00
No. 1 bundles	29.00 to 30.00
No. 2 bundles	23.00 to 24.00
Machine shop turn.	15.50 to 16.50
Mixed bor. and ms. turns.	15.50 to 16.50
Shoveling turnings	19.50 to 20.50
Cast iron borings	18.00 to 19.00
Low phos. punch'gs, plate	32.00 to 33.00
Heavy turnings	27.00 to 28.00
No. 1 RR. hvy. melting	31.50 to 32.50
Scrap rails, random lgth.	37.00 to 38.00
Rails 2 ft and under	43.00 to 44.00
RR. steel wheels	35.00 to 36.00
RR. spring steel	35.00 to 36.00
RR couplers and knuckles	35.00 to 36.00
No. 1 machinery cast.	42.00 to 43.00
Cupola cast.	34.00 to 35.00
Heavy breakable cast.	30.00 to 31.00

Chicago

No. 1 hvy. melting	$29.00 to $30.00
No. 2 hvy. melting	27.00 to 28.00
No. 1 factory bundles	31.00 to 32.00
No. 1 dealers' bundles	29.00 to 30.00
No. 2 dealers' bundles	21.00 to 22.00
Machine shop turn.	14.00 to 15.00
Mixed bor. and turn.	16.00 to 17.00
Shoveling turnings	16.00 to 17.00
Cast iron borings	16.00 to 17.00
Low phos. forge crops	35.00 to 36.00
Low phos. punch'gs, plate	33.00 to 34.00
Low phos. 3 ft and under	32.00 to 33.00
No. 1 RR. hvy. melting	32.00 to 33.00
Scrap rails, random lgth.	36.00 to 38.00
Rerolling rails	44.00 to 45.00
Rails 2 ft and under	44.00 to 45.00
Locomotive tires, cut	33.00 to 34.00
Cut bolsters & side frames	35.00 to 36.00
Angles and splice bars	37.00 to 38.00
RR. steel car axles	40.00 to 41.00
RR. couplers and knuckles	35.00 to 36.00
No. 1 machinery cast.	39.00 to 40.00
Cupola cast	36.00 to 37.00
Heavy breakable cast.	29.00 to 30.00
Cast iron brake shoes	31.00 to 32.00
Cast iron car wheels	33.00 to 34.00
Malleable	40.00 to 41.00
Stove plate	29.00 to 30.00

Philadelphia Area

No. 1 hvy. melting	$26.50 to $27.50
No. 2 hvy. melting	24.50 to 25.50
No. 1 bundles	26.50 to 27.50
No. 2 bundles	18.00 to 19.00
Machine shop turn.	14.00 to 15.00
Mixed bor. short turn.	15.00 to 16.00
Cast iron borings	15.00 to 16.00
Shoveling turnings	17.00 to 18.00
Clean cast chem. borings.	20.00 to 21.00
Low phos. 5 ft and under	28.00 to 29.00
Los phos. 2 ft and under	29.00 to 30.00
Low phos. punch'gs	29.00 to 30.00
Elec. furnace bundles	27.50 to 28.50
Heavy turnings	24.00 to 25.00
RR steel wheels	31.50 to 32.50
RR. spring steel	31.50 to 32.50
Rails 18 in. and under	41.00 to 42.00
Cupola cast.	34.00 to 35.00
Heavy breakable cast.	35.00 to 36.00
Cast iron carwheels	38.00 to 39.00
Malleable	36.00 to 37.00
Unstripped motor blocks.	27.00 to 28.00
No. 1 machinery cast.	40.00 to 41.00
Charging box cast.	36.00 to 37.00

Cleveland

No. 1 hvy. melting	$28.00 to $29.00
No. 2 hvy. melting	25.00 to 26.00
No. 1 bundles	28.00 to 29.00
No. 2 bundles	23.00 to 24.00
No. 1 busheling	28.00 to 29.00
Machine shop turn.	12.00 to 13.00
Mixed bor. and turn.	16.00 to 17.00
Shoveling turnings	16.00 to 17.00
Cast iron borings	16.00 to 17.00
Cut struct'r'l & plate, 2 ft & under	31.50 to 33.00
Drop forge flashings	26.00 to 27.00
Low phos. 2 ft & under	30.00 to 31.00
No. 1 RR. heavy melting	29.00 to 30.00
Rails 3 ft and under	42.00 to 43.00
Rails 18 in. and under	43.00 to 44.00
Railroad grate bars	27.00 to 28.00
Steel axle turnings	19.00 to 20.00
Railroad cast.	41.00 to 42.00
No. 1 machinery cast.	41.00 to 42.00
Stove plate	34.00 to 35.00
Malleable	40.00 to 41.00

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Youngstown

No. 1 hvy. melting	$30.00 to $31.00
No. 2 hvy. melting	26.00 to 27.00
No. 1 bundles	30.00 to 31.00
No. 2 bundles	23.00 to 24.00
Machine shop turn.	14.00 to 15.00
Shoveling turnings	19.00 to 20.00
Cast iron borings	19.00 to 20.00
Low phos. plate	31.00 to 32.00

Buffalo

No. 1 hvy. melting	$26.00 to $27.00
No. 2 hvy. melting	22.00 to 23.00
No. 1 busheling	26.00 to 27.00
No. 1 bundles	26.00 to 27.00
No. 2 bundles	20.00 to 21.00
Machine shop turn.	14.50 to 15.50
Mixed bor. and turn.	17.50 to 18.50
Shoveling turnings	18.00 to 18.50
Cast iron borings	17.50 to 18.50
Low phos. plate	29.00 to 30.00
Scrap rails, random lgth.	33.00 to 34.00
Rails 2 ft and under	40.00 to 41.00
RR. steel wheels	34.00 to 35.00
RR. spring steel	34.00 to 35.00
RR. couplers and knuckles	34.00 to 35.00
No. 1 machinery cast.	38.00 to 39.00
No. 1 cupola cast.	34.00 to 35.00

Detroit

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$22.00 to $23.00
No. 2 hvy. melting	18.00 to 19.00
No. 1 bundles, openhearth	23.00 to 24.00
No. 2 bundles	16.00 to 17.00
New busheling	21.00 to 22.00
Drop forge flashings	21.00 to 22.00
Machine shop turn.	7.00 to 8.00
Mixed. bor. and turn.	9.00 to 10.00
Shoveling turnings	9.00 to 10.00
Cast iron borings	9.00 to 10.00
Low phos. punch'gs, plate	22.00 to 23.00
No. 1 cupola cast.	32.00
Heavy breakable cast.	23.00
Stove plate	28.00
Automotive cast.	36.00

St. Louis

No. 1 hvy. melting	$25.00 to $26.00
No. 2 hvy. melting	23.50 to 24.50
No. 1 bundles	25.00 to 26.00
No. 2 bundles	19.50 to 20.50
Machine shop turn.	12.50 to 13.00
Cast iron borings	13.00 to 14.00
Shoveling turnings	14.00 to 15.00
No. 1 RR. hvy. melting	32.50 to 33.50
Rails, random lengths	35.00 to 36.00
Rails, 18 in. and under	42.00 to 43.00
Locomotive tires, uncut	31.00 to 32.00
Angles and splice bars	34.00 to 35.00
Std. steel car axles	35.00 to 36.00
RR, spring steel	31.00 to 32.00
Cupola cast	41.00 to 42.00
Hvy. breakable cast	30.00 to 31.00
Cast iron brake shoes	26.00 to 27.00
Stove plate	35.00 to 36.00
Cast iron car wheels	32.00 to 33.00
Malleable	35.00 to 36.00
Unstripped motor blocks.	30.00 to 31.00

New York

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$20.50 to $21.50
No. 2 hvy. melting	17.50 to 18.50
No. 2 bundles	15.00 to 16.00
Machine shop turn.	5.00 to 6.00
Mixed bor. and turn.	7.00 to 8.00
Shoveling turnings	8.00 to 9.00
Clean cast chem. borings.	14.00 to 15.00
No. 1 machinery cast.	35.00 to 36.00
Mixed yard cast.	29.00 to 30.00
Charging box cast.	29.00 to 30.00
Heavy breakable cast.	27.00 to 28.00
Unstripped motor blocks.	22.00 to 23.00

Birmingham

No. 1 hvy. melting	20.50
No. 2 hvy. melting	19.50
No. 1 bundles	20.00
No. 2 bundles	$15.00 to 16.00
No. 1 busheling	20.50
Machine shop turn.	15.00 to 16.00
Shoveling turnings	16.00 to 17.00
Cast iron borings	15.00 to 16.00
Electric furnace bundles	26.00 to 27.00
Bar crops and plate	30.50 to 31.50
Structural and plate, 2 ft.	30.50 to 31.50
No. 1 RR. hvy. melting	27.00 to 28.00
Scrap rails, random lgth.	34.00 to 35.00
Rails, 18 in. and under	38.00 to 39.00
Angles & splice bars	35.00 to 36.00
Rerolling rails	39.50 to 40.00
No. 1 cupola cast.	43.50 to 44.50
Stove plate	40.50 to 41.50
Charging box cast.	19.00 to 20.00
Cast iron car wheels	33.00 to 34.00
Unstripped motor blocks.	34.50 to 35.50
Mashed tin cans	15.00 to 16.00

Boston

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$18.00 to $19.00
No. 2 hvy. melting	12.00 to 13.00
No. 1 bundles	18.00 to 19.00
No. 2 bundles	11.50 to 12.50
No. 1 busheling	18.00 to 19.00
Elec. furnace, 3 ft & under	18.00 to 19.00
Machine shop turn.	4.00 to 5.00
Mixed bor. and short turn.	8.00 to 9.00
Shoveling turnings	10.00 to 11.00
Clean cast chem. borings	10.00 to 11.00
No. 1 machinery cast.	29.00 to 30.00
Mixed cupola cast.	26.00 to 27.00
Heavy breakable cast.	25.00 to 26.00
Stove plate	25.00 to 26.00
Unstripped motor blocks.	15.50 to 16.00

Cincinnati

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$25.50 to $26.50
No. 2 hvy. melting	22.50 to 23.50
No. 1 bundles	26.00 to 27.00
No. 2 bundles	19.00 to 20.00
Machine shop turn.	11.00 to 12.00
Mixed bor. and turn.	14.50 to 15.50
Shoveling turnings	14.50 to 15.50
Cast iron borings	14.50 to 15.50
Low phos., 18 in. & under	32.00 to 33.00
Rails, random lengths	35.00 to 36.00
Rails, 18 in. and under	43.00 to 44.00
No. 1 cupola cast.	38.00 to 39.00
Hvy. breakable cast.	34.00 to 35.00
Drop broken cast.	43.00 to 44.00

San Francisco

No. 1 hvy. melting	20.00
No. 2 hvy. melting	16.00
No. 1 bundles	19.00
No. 2 bundles	16.00
No. 3 bundles	12.00
Machine shop turn.	5.00
Cast iron borings	8.00
No. 1 RR. hvy. melting	20.00
No. 1 cupola cast.	$42.00 to 45.00

Los Angeles

No. 1 hvy. melting	20.00
No. 2 hvy. melting	16.00
No. 1 bundles	19.00
No. 2 bundles	$15.50 to 16.00
No. 3 bundles	13.00
Machine shop turn.	5.00
Shoveling turnings	7.00 to 9.00
Cast iron borings	7.00 to 9.00
Elec. fur. 1 ft and under.	25.00
No. 1 RR. hvy. melting	30.00
No. 1 cupola cast.	42.00 to 43.00

Seattle

No. 1 hvy. melting	25.00
No. 2 hvy. melting	21.00
No. 1 bundles	21.50
No. 2 bundles	17.00
No. 3 bundles	13.00
No. 1 cupola cast.	35.00
Mixed yard cast.	35.00

Hamilton, Ont.

No. 1 hvy. melting	$22.00
No. 2 hvy. melting	19.00
No. 1 bundles	22.00
No. 2 bundles	19.00
Mixed steel scrap	17.00
Bushelings	20.00
Bush., new fact prep'd	16.00
Bush., new fact unprep'd	12.00
Short steel turnings	12.00
Mixed bor. and turn.	31.00
Rails, remelting	$42.00 to 45.00
Cast scrap	

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Comparison of Prices

(Effective Aug. 31, 1954)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price advances over previous week are printed in Heavy Type; declines appear in *Italics.*

	Aug. 31 1954	Aug. 24 1954	Aug. 3 1954	Sept. 1 1953
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	4.05¢	4.05¢	4.05¢	3.925¢
Cold-rolled sheets	4.95	4.95	4.95	4.775
Galvanized sheets (10 ga.)	5.45	5.45	5.45	5.275
Hot-rolled strip	4.05	4.05	4.05	3.925
Cold-rolled strip	5.82	5.82	5.82	5.575
Plate	4.237	4.237	4.237	4.10
Plates wrought iron	9.30	9.30	9.30	9.00
Stainl's C-R strip (No. 302)	41.50	41.50	41.50	41.50
Tin and Terneplate: (per base box)				
Tinplate (1.50 lb.) cokes	$8.95	$8.95	$8.95	$8.95
Tinplate, electro (0.50 lb.)	7.65	7.65	7.65	7.65
Special coated mfg. ternes	7.75	7.75	7.75	7.75
Bars and Shapes: (per pound)				
Merchant bars	4.312¢	4.312¢	4.312¢	4.15¢
Cold-finished bars	5.40	5.40	5.40	5.20
Alloy bars	5.075	5.075	5.075	4.875
Structural shapes	4.25	4.25	4.25	4.10
Stainless bars (No. 302)	35.50	35.50	35.50	35.50
Wrought iron bars	10.40	10.40	10.40	10.05
Wire: (per pound)				
Bright wire	5.75¢	5.75¢	5.75¢	5.525¢
Rails: (per 100 lb.)				
Heavy rails	$4.45	$4.45	$4.45	$4.325
Light rails	5.35	5.35	5.35	5.20
Semifinished Steel: (per net ton)				
Rerolling billets	$64.00	$64.00	$64.00	$62.00
Slabs, rerolling	64.00	64.00	64.00	62.00
Forging billets	78.00	78.00	78.00	75.50
Alloy blooms, billets, slabs	86.00	86.00	86.00	82.00
Wire Rod and Skelp: (per pound)				
Wire rods	4.675¢	4.675¢	4.675¢	4.525¢
Skelp	3.90	3.90	3.90	3.75
Finished Steel Composite: (per pound)				
Base price	4.801¢	4.801¢	4.801¢	4.634¢

	Aug. 31 1954	Aug. 24 1954	Aug. 3 1954	Sept. 1 1953
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	$61.19	$61.19	$61.19	$62.19
Foundry, Valley	56.50	56.50	56.50	56.50
Foundry, Southern, Cin'ti	60.43	60.43	60.43	60.43
Foundry, Birmingham	52.88	52.88	52.88	52.88
Foundry, Chicago	56.50	56.50	56.50	56.50
Basic del'd. Philadelphia	60.27	60.27	60.27	61.27
Basic, Valley furnace	56.00	56.00	56.00	56.00
Malleable, Chicago	56.50	56.50	56.50	56.50
Malleable, Valley	56.50	56.50	56.50	56.50
Ferromanganese‡, cents per lb.	10.00¢	10.00¢	10.00¢	10.00¢
‡ 76 pct Mn base.				
Pig Iron Composite: (per gross ton)				
Pig iron	$56.59	$56.59	$56.59	$56.76
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	$29.50	$29.50	$29.50	$42.50
No. 1 steel, Phila. area	27.00	27.00	24.50	40.50
No. 1 steel, Chicago	29.50	29.50	29.50	37.00
No. 1 bundles, Detroit	23.50	23.50	23.50	36.50
Low phos., Youngstown	31.50	31.00	33.00	47.00
No. 1 mach'y cast, Pittsburgh	42.50	42.50	42.50	48.50
No. 1 mach'y cast, Philadel'a	40.50	40.50	39.50	45.50
No. 1 mach'y cast, Chicago	39.50	39.50	39.50	41.00
Steel Scrap Composite: (per gross ton)				
No. 1 heavy melting scrap	$28.67	$28.67	$27.83	$40.00
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.38	$14.38	$14.38	$14.75
Foundry coke, prompt	16.75	16.75	16.75	17.25
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	30.00	30.00	30.00	29.50†
Copper, Lake, Conn.	30.00	30.00	30.00	30.125
Tin, Straits, New York	92.75†	93.125*	95.00	83.50
Zinc, East St. Louis	11.00	11.00	11.00	11.00
Lead, St. Louis	14.05	13.80	13.80	13.80
Aluminum, virgin ingot	22.20	22.20	21.50	21.50
Nickel, electrolytic	63.08	63.08	63.08	63.08
Magnesium, ingot	27.75	27.75	27.75	27.00
Antimony, Laredo, Tex.	28.50	28.50	28.50	34.50

† Tentative. ‡ Average. * Revised.

Finished Steel Composite

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Steel Scrap Composite

Average of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

←To identify producers, see Key on P. 165→

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Bethlehem *B3*	58.00	58.50	59.00	59.50	.....
Birmingham *R3*	52.38	52.88	.....	.....	.....
Birmingham *W9*	52.38	52.88	.....	.....	.....
Birmingham *U4*	52.38	52.88	56.50	.....	.....
Buffalo *R3*	56.00	56.50	57.00	.....	.....
Buffalo *I11*	56.00	56.50	57.00	.....	.....
Buffalo *W6*	56.00	56.50	57.00	.....	.....
Chicago *I4*	56.00	56.50	56.50	57.00	.....
Cleveland *A5*	56.00	56.50	56.50	57.00	61.00
Cleveland *R3*	56.00	56.50	56.50	.....	.....
Daingerfield *L3*	52.50	52.50	52.50	.....	.....
Duluth *I4*	56.00	56.50	56.50	57.00	.....
Erie *I4*	56.00	56.50	56.50	57.00	.....
Everett *M6*	.....	61.00	61.50	.....	.....
Fontana *K1*	62.00	62.50	.....	.....	.....
Geneva, Utah *C7*	56.00	56.50	.....	.....	.....
Granite City *G2*	57.90	58.40	58.90	.....	.....
Hubbard *Y1*	.....	.....	56.50	.....	.....
Minnequa *C6*	58.00	59.00	59.00	.....	.....
Monessen *P6*	56.00	.....	.....	.....	.....
Neville Isl. *P4*	56.00	56.50	56.50	.....	.....
Pittsburgh *U1*	56.00	.....	.....	57.00	.....
Sharpsville *S3*	56.00	56.50	56.50	57.00	.....
So. Chicago *R3*	56.00	.....	56.50	.....	.....
Steelton *B3*	58.00	58.50	59.00	59.50	64.00
Swedeland *A2*	58.00	58.50	59.00	59.50	.....
Toledo *I4*	56.00	56.50	56.50	57.00	.....
Troy, N. Y. *R3*	58.00	58.50	59.00	59.50	64.00
Youngstown *Y1*	.....	.....	56.50	57.00	.....
N. Tonawanda *T1*	.....	56.50	57.00	.....	.....

DIFFERENTIALS: Add 50¢ per ton for each 0.25 pct silicon over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.50 pct manganese over 1 pct, $2 per ton for 0.5 to 0.75 pct nickel, $1 for each addi ional, 0.25 pct nickel. Subtract 38¢ per ton for phosphorus con'ent 0.70 and over.

Silvery Iron: Buffalo, *H1*, $68.25; Jackson, *J1, G1* $67.00. Add $1.50 per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 17 pct. Add $1 per ton for 0.75 pct or more phosphorus. Add 75¢ for each 0.50 pct manganese over 1.0 pct. Bessemer ferrosilicon prices are $1 over comparable silvery iron.

STAINLESS STEEL

Base price cents per lb. f.o.b. mill

Product	301	302	303	304	316	321	347	410	416	430
Ingots, rerolling	16.25	17.25	18.75	18.25	28.00	22.75	24.50	14.00	.....	14.25
Slabs, billets, rerolling	20.50	22.75	24.75	23.75	36.25	29.50	32.25	18.25	.....	18.50
Forg. discs, die blocks, rings	38.50	38.50	41.50	40.50	60.00	45.50	50.75	31.00	31.75	31.75
Billets, forging	29.50	29.75	32.25	31.00	46.50	35.25	39.50	24.00	24.50	24.50
Bars, wires, structurals	35.25	35.50	38.25	37.25	55.50	42.00	46.75	28.75	29.25	29.25
Plates	37.25	37.50	39.75	39.75	58.75	45.75	51.25	30.00	30.50	30.50
Sheets	41.25	41.50	48.75	43.75	62.75	50.50	59.25	34.25	41.25	34.75
Strip, hot-rolled	29.75	32.00	36.75	34.25	53.25	41.00	46.50	26.25	.....	27.00
Strip, cold-rolled	38.25	41.50	45.50	43.75	62.75–63.00	50.50–50.75	59.25	34.25	41.25	34.75

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., *C11;* Brackenridge, Pa., *A3;* Butler, Pa., *A7;* McKeesport, Pa., *U1;* Washington, Pa., *W2, J2;* Baltimore, *E1;* Middletown, O., *A7;* Massillon, O., *R3;* Gary, *U1;* Bridgeville, Pa., *U2;* New Castle, Ind., *I2;* Ft. Wayne, *J4.*

Strip: Midland, Pa., *C11;* Cleveland, *A5;* Carnegie, Pa., *S9;* McKeesport, Pa., *F1;* Reading, Pa., *C2;* Washington, Pa., *W2;* W. Leechburg, Pa., *A3;* Bridgeville, Pa., *U2;* Detroit, *M2;* Canton-Massillon, O., *R3;* Middletown, O., *A7;* Harrison, N. J., *D3;* Youngstown, *C5;* Sharon, Pa., *S1;* Butler, Pa., *A7;* Wallingford, Conn., *U3* (.25¢ per lb higher) *W1* (.25¢ per lb higher); New Bedford, Mass., *R6.*

Bar: Baltimore, *A7;* Duquesne, Pa., *U1;* Munhall, Pa., *U1;* Reading, Pa., *C2;* Titusville, Pa., *U2;* Washington, Pa., *J2;* McKeesport, Pa., *U1, F1;* Bridgeville, Pa., *U2;* Dunkirk, N. Y., *A3;* Massillon, O., *R3;* Chicago, *U1;* Syracuse, N. Y., *C11;* Watervliet, N. Y., *A3;* Waukegan, *A5;* Canton, O., *T5;* Ft. Wayne, *I4.*

Wire: Waukegan, *A5;* Massillon, O., *R3;* McKeesport, Pa., *F1;* Ft. Wayne, *J4;* Harrison, N. J., *D3;* Baltimore, *A7;* Dunkirk, *A3;* Monessen, *P1;* Syracuse, *C11;* Bridgeville, *U2.*

Structurals: Baltimore, *A7;* Massillon, O., *R3;* Chicago, Ill., *J4;* Watervliet, N. Y., *A3;* Syracuse, *C11*

Plates: Brackenridge, Pa., *A3;* Chicago, *U1;* Munhall, Pa., *U1;* Midland, Pa., *C11;* New Castle, nd., *I2;* Middletown, *A7;* Washington, Pa., *J2;* Cleveland, Massillon, *R3;* Coatesville, Pa., *C15.*

Forged discs, die blocks, rings: Pittsburgh, *C11;* Syracuse, *C11;* Ferndale, Mich., *A3;* Washington, Pa *J2.*

Forging billets: Midland, Pa., *C11;* Baltimore, *A7;* Washington, Pa., *J2;* McKeesport, *F1;* Massillon Canton, O., *R3;* Watervliet, *A3;* Pittsburgh, Chicago, *U1;* Syracuse, *C11.*

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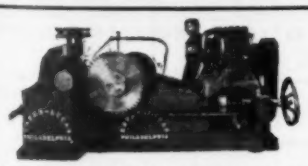

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IRON AGE

STEEL PRICES

(Effective Aug. 31, 1954)

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BILLETS, BLOOMS, SLABS			PIL-ING	SHAPES STRUCTURALS			STRIP					
		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide-Flange	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled	Alloy Cold-rolled
EAST	Bethlehem, Pa.			$86.00 *B3*		4.30 *B3*	6.45 *B3*	4.30 *B3*						
	Buffalo, N. Y.	$64.00 *B3*	$78.00 *B3, R3*	$86.00 *B3, R3*	5.075 *B3*	4.30 *B3*	6.45 *B3*	4.30 *B3*	4.05 *B3,R3*	5.75 *B3,R7*	6.15 *B3*	8.425 *B3*		
	Claymont, Del.													
	Coatesville, Pa.													
	Conshohocken, Pa.								4.175 *A2*		6.15 *A2*			
	New Bedford, Mass.									6.20 *R6*				
	Harrison, N. J.													
	Johnstown, Pa.	$64.00 *B3*	$78.00 *B3*	$86.00 *B3*		4.30 *B3*	6.45 *B3*		4.05 *B3*					
	Fairless, Pa.													
	New Haven, Conn.									6.20 *D1* 6.50 *A5*				
	Phoenixville, Pa.					3.95 *P2*		3.95 *P2*						
	Sparrows Pt., Md.								4.05 *B3*	5.75 *B3*	6.15 *B3*	8.425 *B3*		
	Wallingford, Conn.									6.20 *W1*				
	Worcester, Mass. Pawtucket, R. I.									6.30 *N7* 6.60 *A5*				12.75 *A5* 12.80 *N7*
MIDDLE WEST	Alton, Ill.								4.225 *L1*					
	Ashland, Ky.								4.05 *A7*					
	Canton-Massillon, Dover, Ohio		$88.00 *R3*	$82.00 *T5* $86.00 *R3*										12.45 *G1*
	Chicago, Ill.	$64.00 *U1*	$78.00 *R3, U1,W8*	$86.00 *U1, W8,R3*	5.075 *U1*	4.25 *U1, W8*	6.40 *U1, Y1*	4.25 *U1*	4.05 *A1, N4, W8*	5.85 *A1*				
	Cleveland, Ohio									5.75 *A5,J3*		8.60 *A5*		12.45 *A5*
	Detroit, Mich.			$88.00 *R5*					4.20 *G3,M2*	5.90 *D1,D2, G3,M2,P11*	6.30 *G3*	8.35 *D2* 8.75 *G3*		
	Duluth, Minn.													
	Gary, Ind. Harbor, Indiana	$64.00 *U1*	$78.00 *U1*	$86.00 *U1, Y1*	5.075 *I3*	4.25 *I3, U1*	6.40 *U1, I3*		4.05 *I3, U1,Y1*	6.00 *I3*	6.15 *U1, I3, Y1*	8.60 *Y1*	6.70 *U1, Y1*	
	Sterling, Ill.								4.15 *N4*					
	Indianapolis, Ind.									5.90 *C5*				
	Newport, Ky.												6.70 *N5*	
	Middletown, Ohio									5.75 *A7*				
	Niles, Warren, Ohio Sharon, Pa.								4.05 *S1,R3*	5.75 *S1,R3, T4*	6.15 *S1, R3*	8.60 *S1,R3*	6.70 *S1*	12.45 *S1*
	Pittsburgh, Pa. Midland, Pa. Butler, Pa.	$64.00 *U1, J3*	$78.00 *J3, U1,C11*	$86.00 *U1, C11*	5.075 *U1*	4.25 *J3, U1*	6.40 *J3, U1*	4.25 *U1*	4.05 *S7,P6*	5.75 *B4,J3, S7*			6.70 *S9*	12.45 *S9*
	Portsmouth, Ohio								4.05 *P7*	5.75 *P7*				
	Weirton, Wheeling, Follansbee, W. Va.					4.25 *W3*			4.05 *W3*	5.75 *F3, W3*	6.15 *W3*	8.60 *W3*		
	Youngstown, Ohio		$78.00 *C10*	$86.00 *Y1, C10*		4.25 *Y1*	6.40 *Y1*		4.05 *U1,Y1*	5.75 *Y1, C5*	6.15 *U1, Y1*	8.60 *Y1*	6.70 *U1, Y1*	12.45 *C5*
WEST	Fontana, Cal.	$72.00 *K1*	$86.00 *K1*	$105.00 *K1*		4.90 *K1*	7.05 *K1*	5.25 *K1*	4.825 *K1*	7.65 *K1*	7.25 *K1*		8.10 *K1*	14.56 *K1*
	Geneva, Utah		$78.00 *C7*			4.25 *C7*	6.40 *C7*							
	Kansas City, Mo.					4.85 *S2*	7.00 *S2*		4.65 *S2*				7.30 *S2*	
	Los Angeles, Torrance, Cal.		$87.50 *B2*	$106.00 *B2*		4.95 *B2, C7*	7.10 *B2*		4.80 *B2,C7*	7.80 *C1*				
	Minnequa, Colo.					4.70 *C6*			5.15 *C6*					
	San Francisco, Niles, Pittsburg, Cal.		$87.50 *B2*			4.90 *B2* 4.95 *P9*	7.05 *B2*		4.80 *B2,C7*					
	Seattle, Wash.		$91.50 *B2*			5.00 *B2*	7.15 *B2*		5.05 *B2, P12*					
SOUTH	Atlanta, Ga.								4.25 *A8*					
	Fairfield, Ala. City, Birmingham, Ala.	$64.00 *T2*	$78.00 *T2*			4.25 *T2,C16* 4.28 *R3*	6.40 *T2*		4.05 *R3, T2,C16*		6.15 *T2*			
	Houston, Tex.		$85.00 *S2*	$93.00 *S2*		4.65 *S2*	6.85 *S2*		4.45 *S2*				7.10 *S2*	

STEEL PRICES

(Effective Aug. 31, 1954)

Italics identify producers listed in key at end of table. Base prices, f.o.b., mill in cents per lb., unless otherwise noted. Extras apply.

		SHEETS									WIRE ROD	TINPLATE†		BLACK PLATE
		Hot-rolled *18* ga. & hvyr.	Cold-rolled	Galvanized *10* ga.	Enameling *12* ga.	Long Terne *10* ga.	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.	Hot-rolled *19* ga.		Coke* *1.25*-lb. base box	Electro* *0.25*-lb. base box	Hollowware Enameling *29* ga.
EAST	Bethlehem, Pa.													
	Buffalo, N. Y.	4.05 *B3*	4.95 *B3*				6.10 *B3*	7.50 *B3*			4.675 *W6*			
	Claymont, Del.											† Special coated mfg. terne deduct 95¢ from 1.25-lb coke base box price. Can-making quality blackplate 55 to 128 lb deduct $2.20 from 1.25-lb coke base box. * COKES: 1.50 lb add 25¢. ELECTRO: 0.50-lb add 25¢; 0.75-lb add 65¢; 1.00-lb add $1.20.		
	Coatesville, Pa.													
	Conshohocken, Pa.	4.10 *A2*					6.10 *A2*							
	Harrisburg, Pa.													
	Hartford, Conn.													
	Johnstown, Pa.										4.675 *B3*			
	Fairless, Pa.	4.10 *U1*	5.00 *U1*				6.15 *U1*	7.55 *U1*				$8.80 *U1*	$7.50 *U1*	
	New Haven, Conn.													
	Phoenixville, Pa.													
	Sparrows Pt., Md.	4.05 *B3*	4.95 *B3*	5.45 *B3*			6.10 *B3*	7.50 *B3*	8.20 *B3*		4.775 *B3*	$8.80 *B3*	$7.50 *B3*	
	Worcester, Mass.										4.975 *A5*			
	Trenton, N. J.													
MIDDLE WEST	Alton, Ill.										4.85 *L1*			
	Ashland, Ky.	4.05 *A7*		5.45 *A7*	5.375 *A7*									
	Canton-Massillon, Dover, Ohio			5.45 *R1,R3*						5.175 *R1*				
	Chicago, Joliet, Ill.	4.05 *A1, W2*					6.10 *U1*				4.675 *A5, N4,R3*			
	Sterling, Ill.										4.775 *N4*			
	Cleveland, Ohio	4.05 *J3, R3*	4.95 *J3, R3*		5.375 *R3*		6.10 *J3, R3*	7.50 *J3, R3*			4.675 *A5*			
	Detroit, Mich.	4.20 *G3, M2*	5.10 *G3*				6.25 *G3*	7.65 *G3*						
	Newport, Ky.	4.05 *N3*		5.45 *N3*										
	Gary, Ind. Harbor, Indiana	4.05 *I3, U1,Y1*	4.95 *I3, U1,Y1*	5.45 *U1, I3*	5.375 *I3, U1*	5.85 *U1*	6.10 *U1,I3, Y1*	7.50 *U1, Y1*			4.675 *Y1*	$8.70 *I3, U1,Y1*	$7.40 *I3, U1, Y1*	6.10 *U1, Y1*
	Granite City, Ill.	4.25 *G2*	5.15 *G2*	5.65 *G2*	5.575 *G2*								$7.80 *G2*	6.30 *G2*
	Kokomo, Ind.	4.15 *C9*		5.55 *C9*						5.20 *C9*	4.775 *C9*			
	Mansfield, Ohio					5.85 *E2*				5.175 *E2*				
	Middletown, Ohio		4.95 *A7*		5.375 *A7*	5.85 *A7*								
	Niles, Ohio Sharon, Pa.	4.05 *S1,R3* 5.30 *N3*	4.95 *R3* 5.975 *N3*	5.45 *N3*	6.725 *N3*	5.85 *N3*	6.10 *S1,R3*	7.50 *R3*				$8.70 *R3*	$7.40 *R3*	
	Pittsburgh, Pa. Midland, Pa. Butler, Pa.	4.05 *J3, U1,P6*	4.95 *J3, U1,P6*	5.45 *U1*	5.375 *U1*		6.10 *J3, U1*	7.50 *J3, U1*	8.20 *U1*		4.675 *A5* 4.875 *P6*	$8.70 *J3, U1*	$7.40 *J3, U1*	6.10 *U1*
	Portsmouth, Ohio	4.05 *P7*	4.95 *P7*								4.675 *P7*			
	Weirton, Wheeling, Follansbee, W. Va.	4.05 *W3, W5*	4.95 *W3, W5,F3*	5.45 *W3, W5*		5.85 *W3, W5*	6.10 *W3*	7.50 *W3*				$8.70 *W3, W5*	$7.40 *W3, W5*	6.10 *F3, W5*
	Youngstown, Ohio	4.05 *U1, Y1*	4.95 *Y1*		5.375 *Y1*		6.10 *U1, Y1*	7.50 *Y1*			4.675 *Y1*			
WEST	Fontana, Cal.	4.825 *K1*	6.05 *K1*				6.875 *K1*	8.55 *K1*			5.475 *K1*			
	Geneva, Utah	4.15 *C7*					6.45 *C7*							
	Kansas City, Mo.													
	Los Angeles, Torrance, Cal.										5.475 *C7, B2*			
	Minnequa, Colo.										4.925 *C6*			
	San Francisco, Niles, Pittsburg, Cal.	4.75 *C7*	5.90 *C7*	6.20 *C7*							5.325 *C7*	$9.45 *C7*	$8.15 *C7*	
	Seattle, Wash.													
SOUTH	Atlanta, Ga.													
	Fairfield, Ala. Alabama City, Ala.	4.05 *R3, T2*	4.95 *T2*	5.45 *R3, T2*			6.10 *T2*			5.35 *R3*	4.675 *T2, R3*	$8.80 *T2*	$7.50 *T2*	
	Houston, Texas	4.45 *S2*									5.075 *S2*			

IRON AGE

STEEL PRICES

(Effective Aug. 31, 1954)

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BARS						PLATES				WIRE
		Carbon Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfr's. Bright
EAST	Bethlehem, Pa.				5.075 *B3*	6.625 *B3*	6.45 *B3*					
	Buffalo, N. Y.	4.30 *B3* 4.33 *R3*	4.30 *B3* 4.33 *R3*	5.45 *B5*	5.075 *B3* 5.105 *R3*	6.625 *B3,B5*	6.45 *B3*	4.225 *B3*			6.45 *B3*	5.75 *W6*
	Claymont, Del.							4.225 *C4*		5.80 *C4*		
	Coatesville, Pa.							4.225 *L4*		5.80 *L4*		
	Conshohocken, Pa.							4.225 *A2*	5.275 *A2*		6.45 *A2*	
	Harrisburg, Pa.							3.975C3	5.275C3			
	Hartford, Conn.			5.90 *R3*		6.925 *R3*						
	Johnstown, Pa.	4.30 *B3*	4.30 *B3*		5.075 *B3*		6.45 *B3*	4.225 *B3*		5.80 *B3*	6.45 *B3*	5.75 *B3*
	Fairless, Pa.	4.45 *U1*	4.45 *U1*		5.225 *U1*							
	Newark, N. J.			5.85 *W10*		6.80 *W10*						
	Camden, N. J.			5.85 *P10*								
	Putnam, Conn.			5.95 *W10*								
	Sparrows Pt., Md.		4.30 *B3*					4.225 *B3*		5.80 *B3*	6.45 *B3*	5.85 *B3*
	Palmer, Worcester, Readville, Mansfield, Mass.			5.85*W11* 5.95*B5, C14*		6.925 *A5* 7.075 *B5*						6.05 *A5, W6*
MIDDLE WEST	Alton, Ill.	4.50 *L1*										5.925 *L1*
	Ashland, Newport, Ky.							4.225 *A7, N5*		5.80 *N5*		
	Canton-Massillon, Mansfield, Ohio	4.46 *R3*		5.40 *R2* 5.44 *R3*	4.875 *T5* 5.115 *R3*	6.325 *T5* 6.625 *R2* 6.665 *R3*		4.225 *E2*				
	Chicago, Joliet, Ill.	4.30 *U1, N4,W8* 4.37 *R3*	4.30 *N4* 4.37 *R3*	5.40 *A5,W10, W8,B5,L2*	5.075 *U1, W8* 5.145 *R3*	6.625 *A5,W8, W10,L2, B5*		4.225 *U1,W8, I3, A1*	5.275 *U1*	5.80 *U1*	6.45 *U1*	5.75 *A5, R3,N4,W*
	Cleveland, Ohio	4.36 *R3*	4.36 *R3*	5.40 *A5,C13*		6.625 *A5* 6.665 *C13*	6.45 *R3*	4.225 *J3* 4.285 *R3*	5.275 *J3*		6.45 *J3,R3*	5.75 *A5, C13*
	Detroit, Mich.	4.45 *R5,G3*		5.55 *R5* 5.60 *B5,P8* 5.65 *P3*	5.175 *R5* 5.225 *G3*	6.725 *R5* 6.825 *B5,P3, P8*	6.60 *G3*	4.375 *G3*			6.60 *G3*	
	Duluth, Minn.											5.75 *A5*
	Gary, Ind. Harbor, Crawfordsville	4.30 *I3, U1, Y1*	4.30 *I3, U1, Y1*	5.40 *M5* 5.47 *R3*	5.075 *I3, U1, Y1*	6.525 *M5* 6.695 *R3*	6.45 *U1,I3, Y1*	4.225 *I3, U1,Y1*	5.275 *I3*	5.80 *U1, Y1*	6.45 *U1,I3, Y1*	5.85 *M4*
	Granite City, Ill.							4.425 *G2*				
	Kokomo, Ind.											5.85 *C9*
	Sterling, Ill.	4.40 *N4*	4.40 *N4*									5.85 *N4*
	Niles, Ohio Sharon, Pa.	4.34 *R3*					6.45 *R3*	4.225 *S1*		5.80 *S1*	6.45 *S1*	
	Pittsburgh, Pa. Midland, Pa.	4.30 *J3, U1, C11*	4.30 *J3, U1*	5.40 *A5,C8,C11 J3,W10,B4* 5.46 *R3*	5.075 *U1,C11.*	6.625 *A5,C11, W10,C8* 6.685 *R3*	6.45 *J3, U1*	4.225 *J3, U1*	5.275 *U1*	5.80 *U1*	6.45 *J3, U1*	5.75 *A5,J3, P6*
	Portsmouth, Ohio											5.75 *P7*
	Weirton, Wheeling, Follansbee, W. Va.	4.30 *W3*						4.225 *W3, W5*				
	Youngstown, Ohio	4.30 *U1 Y1 C10* 4.35 *R3*	4.30 *U1, Y1* 4.35 *R3*	5.40 *F2, Y1, C10*	5.075 *U1, Y1, C10*	6.625 *Y1, C10* 6.665 *F2*	6.45 *U1, Y1*	4.225 *U1, Y1*		5.80 *Y1*	6.45 *Y1*	5.75 *Y1*
WEST	Emeryville, Cal.	5.05 *J5*	5.05 *J5*									
	Fontana, Cal.	5.00 *K1*	5.00 *K1*		6.125 *K1*		7.70 *K1*	4.875 *K1*		6.45 *K1*	7.15 *K1*	
	Geneva, Utah							4.225 *C7*			6.45 *C7*	
	Kansas City, Mo.	4.90 *S2*	4.90 *S2*		5.675 *S2*		7.05 *S2*					6.35 *S2*
	Los Angeles, Torrance, Cal.	5.00 *B2,C7*	5.00 *B2,C7*	6.85 *R3*	6.125 *B2*		7.15 *B2*					6.70 *B2*
	Minnequa, Colo.	4.75 *C6*	4.75 *C6*					5.075 *C6*				5.90 *C6*
	Portland, Ore.	4.90 *O2*										
	San Francisco, Niles, Pittsburg, Cal.	5.00 *C7,P9* 5.05 *B2*	5.00 *C7,P9* 5.05 *B2*				7.20 *B2*					6.70 *C7*
	Seattle, Wash.	5.05 *B2, P12. N6*	5.05 *B2, P12*				7.20 *B2*	5.125 *B2*		6.70 *B2*	7.35 *B2*	
SOUTH	Atlanta, Ga.	4.50 *A8*	4.50 *A8*									5.95 *A8*
	Fairfield, Ala. City, Birmingham, Ala.	4.30 *T2,C16* 4.33 *R3*	4.30 *T2, C16* 4.33 *R3*				6.45 *T2*	4.225 *T2* 4.255 *R3*			6.45 *T2*	5.75 *R3, T2*
	Houston, Ft. Worth, Lone Star, Tex.	4.70 *S2*	4.70 *S2*		5.475 *S2*		6.85 *S2*	4.40 *L3* 4.625 *S2*		6.20 *S2*	6.85 *S2*	6.25 *S2*

Steel Prices

(Effective Aug. 31, 1954)

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angell Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, O.
A8 Atlantic Steel Co., Atlanta, Ga.

B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Pacific Coast Steel Corp., San Francisco
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin, Inc., Harvey, Ill.

C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C3 Central Iron & Steel Co., Harrisburg, Pa.
C4 Claymont Products Dept., Claymont, Del.
C5 Cold Metal Products Co., Youngstown, O.
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Pittsburgh, Pa.
C11 Crucible Steel Co. of America, New York
C12 Cumberland Steel Co., Cumberland, Md.
C13 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shafting Co., Readville, Mass.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Div., Birmingham

D1 Detroit Steel Corp., Detroit
D2 Detroit Tube & Steel Div., Detroit
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill.

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire Steel Co., Mansfield, O.

F1 Firth Sterling, Inc., McKeesport, Pa.
F2 Fitzsimmons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.

G1 Globe Iron Co., Jackson, O.
G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit
G4 Greer Steel Co., Dover, O.

H1 Hanna Furnace Corp., Detroit

I2 Ingersoll Steel Div., Chicago
I3 Inland Steel Co., Chicago
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Cal.
K2 Keystone Steel & Wire Co., Peoria
K3 Koppers Co., Granite City, Ill.

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid-States Steel & Wire Co., Crawfordsville, Ind.
M5 Monarch Steel Co., Inc., Hammond, Ind.
M6 Mystic Iron Works, Everett, Mass.

N1 National Supply Co., Pittsburgh
N2 National Tube Div., Pittsburgh
N3 Niles Rolling Mill Div., Niles, O.
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N5 Newport Steel Corp., Newport, Ky.
N6 Northwest Steel Rolling Mills, Seattle
N7 Newman Crosby Steel Co., Pawtucket, R. I.

O1 Oliver Iron & Steel Co., Pittsburgh
O2 Oregon Steel Mills, Portland

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Iron & Steel Co., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P5 Pittsburgh Screw & Bolt Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal.
P10 Precision Drawn Steel Co., Camden, N. J.
P11 Production Steel Strip Corp., Detroit
P12 Pacific Steel Rolling Mills, Seattle

R1 Reeves Steel & Mfg. Co., Dover, O.
R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co., John A., Trenton, N. J.
R5 Rotary Electric Steel Co., Detroit
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon, Pa.
S2 Sheffield Steel Corp., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw & Steel Co., Fitchburg, Mass.
S5 Sweet's Steel Co., Williamsport, Pa.
S6 Standard Forging Corp., Chicago
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Corp., Carnegie, Pa.

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T6 Tremont Nail Co., Wareham, Mass.
T7 Texas Steel Co., Fort Worth

U1 United States Steel Corp., Pittsburgh
U2 Universal-Cyclops Steel Corp., Bridgeville, Pa.
U3 Ulbrich Stainless Steels, Wallingford, Conn.
U4 U. S. Pipe & Foundry Co., Birmingham

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago
W8 Wisconsin Steel Co., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wycoff Steel Co., Pittsburgh
W11 Worcester Pressed Steel Co., Worcester, Mass.

Y1 Youngstown Sheet & Tube Co., Youngstown

PIPE AND TUBING

Base discounts (pct) f.o.b. mills. Base price about $200 per net ton.

	BUTTWELD														SEAMLESS							
	½ In.		¾ In.		1 In.		1¼ In.		1½ In.		2 In.		2½–3 In.		2 In.		2½ In.		3 In.		3½–4 In.	
	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
STANDARD T. & C.																						
Sparrows Pt. *B3*	21.75	6.5	24.75	10.5	27.25	14.0	29.75	14.75	30.25	15.75	30.75	16.25	32.25	16.0	.....	.....	.....	.....	.....	.....	.....	.....
Youngstown *R3*	23.75	8.5	26.75	12.5	29.25	16.0	31.75	16.75	32.25	17.75	32.75	18.25	34.25	18.0	.....	.....	.....	.....	.....	.....	.....	.....
Fontana *K1*	10.75	+4.5	13.75	+0.5	16.25	3.0	18.75	3.75	19.25	4.75	19.75	5.25	21.25	5.0	.....	.....	.....	.....	.....	.....	.....	.....
Pittsburgh *J3*	23.75	8.5	26.75	12.5	29.25	16.0	31.75	16.75	32.25	17.75	32.75	18.25	34.25	18.0	13.5	+1.50	17.5	0.75	20.0	3.25	21.5	4.75
Alton, Ill. *L1*	21.75	6.5	24.75	10.5	27.25	14.0	29.75	14.75	30.25	15.75	30.75	16.25	32.25	16.0	.....	.....	.....	.....	.....	.....	.....	.....
Sharon *M3*	23.75	8.5	26.75	12.5	29.25	16.0	31.75	16.75	32.25	17.75	32.75	18.25	34.25	18.0	.....	.....	.....	.....	.....	.....	.....	.....
Fairless *N2*	21.75	6.5	24.75	10.5	27.25	14.0	29.75	14.75	30.25	15.75	30.75	16.25	32.25	16.0	.....	.....	.....	.....	.....	.....	.....	.....
Pittsburgh *N1*	23.75	8.5	26.75	12.5	29.25	16.0	31.75	16.75	32.25	17.75	32.75	18.25	34.25	18.0	13.5	+1.50	17.5	0.75	20.0	3.25	21.5	4.75
Wheeling *W5*	23.75	8.5	26.75	12.5	29.25	16.0	31.75	16.75	32.25	17.75	32.75	18.25	34.25	18.0	.....	.....	.....	.....	.....	.....	.....	.....
Wheatland *W4*	23.75	8.5	26.75	12.5	29.25	16.0	31.75	16.75	32.25	17.75	32.75	18.25	34.25	18.0	.....	.....	.....	.....	.....	.....	.....	.....
Youngstown *Y1*	23.75	8.5	26.75	12.5	29.25	16.0	31.75	16.75	32.25	17.75	32.75	18.25	34.25	18.0	13.5	+1.50	17.5	0.75	20.0	3.25	21.5	4.75
Indiana Harbor *Y1*	22.75	7.5	25.75	11.5	28.25	15.0	30.75	15.75	31.25	16.75	31.75	17.25	33.25	17.0	.....	.....	.....	.....	.....	.....	.....	.....
Lorain *N2*	23.75	8.5	26.75	12.5	29.25	16.0	31.75	16.75	32.25	17.75	32.75	18.25	34.25	18.0	13.5	+1.50	17.5	0.75	20.0	3.25	21.5	4.75
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. *B3*	25.25	11.5	29.25	15.5	31.25	19.0	31.75	17.75	32.25	18.75	32.75	19.25	33.25	18.0	.....	.....	.....	.....	.....	.....	.....	.....
Youngstown *R3*	27.25	13.5	31.25	17.5	33.25	21.0	33.75	19.75	34.25	20.75	34.75	21.25	35.25	20.0	.....	.....	.....	.....	.....	.....	.....	.....
Fairless *N2*	25.25	11.5	29.25	15.5	31.25	19.0	31.75	17.75	32.25	18.75	32.75	19.25	33.25	18.0	.....	.....	.....	.....	.....	.....	.....	.....
Fontana *K1*	14.25	.....	18.25	.....	20.25	.....	20.75	.....	21.25	.....	21.75	.....	22.25	.....	.....	.....	.....	.....	.....	.....	.....	.....
Pittsburgh *J3*	27.25	13.5	31.25	17.5	33.25	21.0	33.75	19.75	34.25	20.75	34.75	21.25	35.25	20.0	14.0	.....	19.0	3.25	21.5	5.75	26.5	10.75
Alton, Ill. *L1*	25.25	11.5	29.25	15.5	31.25	19.0	31.75	17.75	32.25	18.25	32.75	19.25	33.25	18.0	.....	.....	.....	.....	.....	.....	.....	.....
Sharon *M3*	27.25	13.5	31.25	17.5	33.25	21.0	33.75	19.75	34.25	20.75	34.75	21.75	35.25	20.0	.....	.....	.....	.....	.....	.....	.....	.....
Pittsburgh *N1*	27.25	13.5	31.25	17.5	33.25	21.0	33.75	19.75	34.25	20.75	34.75	21.75	35.25	20.0	14.0	.....	19.0	3.25	21.5	5.75	26.5	10.75
Wheeling *W5*	27.25	13.5	31.25	17.5	33.25	21.0	33.75	19.75	34.25	20.75	34.75	21.75	35.25	20.0	.....	.....	.....	.....	.....	.....	.....	.....
Wheatland *W4*	27.25	13.5	31.25	17.5	33.25	21.0	33.75	19.75	34.25	20.75	34.75	21.75	35.25	20.0	.....	.....	.....	.....	.....	.....	.....	.....
Youngstown *Y1*	27.25	13.5	31.25	17.5	33.25	21.0	33.75	19.75	34.25	20.75	34.75	21.75	35.25	20.0	14.0	.....	19.0	3.25	21.5	5.75	26.5	10.75
Indiana Harbor *Y1*	26.25	12.5	30.25	16.5	32.25	20.0	32.75	18.75	33.25	19.75	33.75	20.75	34.25	19.0	.....	.....	.....	.....	.....	.....	.....	.....
Lorain *N2*	27.25	13.5	31.25	17.5	33.25	21.0	33.75	19.75	34.25	20.75	34.75	21.75	35.25	20.0	14.0	.....	19.0	3.25	21.5	5.75	26.5	10.75

Threads only, buttweld and seamless 2¼ pt. higher discount. Plain ends, buttweld and seamless, 3-in. and under, 4½ pt. higher discount. Buttweld jobbers' discount, 5 pct.

Galvanized discounts based on zinc price in range of over 9¢ to 11¢ incl. per lb, East St. Louis. For each 2¢ change in zinc, discounts vary as follows: ½, ¾ and 1-in., 2 pt.; 1¼, 1½ and 2-in., 1½ pt.; 2½ and 3-in., 1 pt. e.g., zinc price in range of over 11¢ to 13¢ would lower discounts; zinc price in range of over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 11.00¢ per lb.

Steel Prices

(Effective Aug. 31, 1954)

To identify producers, see Key on preceding page.

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Screw Spikes	Tie Plates	Track Bolts Treated
Bessemer *UI*	4.45	5.35	5.425	.....	.....	.....	.....
So. Chicago *R3*	.....	.....	.....	7.30	.....	.....	.....
Ensley *T2*	4.45	5.35	.....	.....	.....	.....	.....
Fairfield *T2*	.....	5.35	.....	7.30	.....	5.275	.....
Gary *UI*	4.45	5.35	.....	.....	.....	5.275	.....
Ind. Harbor *I3*	4.45	.....	5.425	7.30	.....	5.275	.....
Johnstown *B3*	.....	5.35	.....	.....	.....	.....	.....
Joliet *UI*	.....	5.35	5.425	.....	.....	.....	.....
Kansas City *S2*	.....	.....	.....	7.30	.....	.....	11.50
Lackawanna *B3*	4.45	5.35	5.425	.....	.....	5.275	.....
Minnequa *C6*	4.45	5.85	5.425	7.30	.....	5.275	11.50
Pittsburgh *O1*	.....	.....	.....	.....	11.00	.....	11.50
Pittsburgh *P5*	.....	.....	.....	.....	11.00	.....	11.50
Pittsburgh *J3*	.....	.....	.....	7.30	.....	.....	.....
Seattle *B2*	.....	.....	.....	7.80	.....	5.425	11.50
Steelton *B3*	4.45	.....	5.425	.....	.....	5.275	.....
Struthers *Y1*	.....	.....	.....	7.30	.....	.....	.....
Torrance *C7*	.....	.....	.....	.....	.....	5.425	.....
Williamsport *S5*	.....	5.35	.....	.....	.....	.....	.....
Youngstown *R3*	.....	.....	.....	7.30	.....	.....	.....

ELECTRICAL SHEETS

22-Gage F.o.b. Mill Cents Per Lb	Hot-Rolled (Cut Lengths) *	Cold-Reduced (Coiled or Cut Length) Semi-Processed	Cold-Reduced (Coiled or Cut Length) Fully Processed
Field	8.025	8.225	.....
Armature	8.50	8.75	9.25
Elect.	9.10	9.35	9.85
Motor	10.10	10.35	10.85
Dynamo	11.00	11.25	11.75
Trans. 72	11.95	12.20	12.70
Trans. 65	12.50	Grain Oriented	
Trans. 58	13.00	Trans. 80	16.60
Trans. 52	14.00	Trans. 73	17.10

Producing points: Beech Bottom (*W5*); Brackenridge (*A5*); Granite City (*G2*); Indiana Harbor (*I3*); Manafield (*E2*); Newport, Ky. (*N5*); Niles, O. (*N3*); Vandergrift (*U1*); Warren, O. (*R3*); Zanesville (*A7*).

* Coils 75¢ higher.

CLAD STEEL

	Plate	Sheet
Stainless-carbon		
No. 304, 20 pct.		
Coatesville, Pa., *L4*	*33.20	
Washington, Pa., *J2*	.....	
Claymont, Del., *C4*	.....	
New Castle, Ind., *I2*	.....	32.50
Nickel-carbon		
10 pct. Coatesville, Pa., *L4*	38.30	
Inconel-carbon		
10 pct., Coatesville, Pa., *L4*	46.90	
Monel-carbon		
10 pct. Coatesville, Pa., *L4*	39.70	

* Includes annealing and pickling, sandblasting.

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard & Coated Nails Col	Woven Wire Fence 9-15½ ga. Col	"T" Fence Posts Col	Single Loop Bale Ties Col	Galv. Barbed and Twisted Barbless Wire Col	Merch. Wire Ann'ld ¢/lb.	Merch. Wire* Galv. ¢/lb.
Alabama City *R3*	137	146	...	155	159	6.90	7.30
Aliquippa, Pa. *J3*	137	149	...	...	156	6.90	7.425
Atlanta *A8*	139	151	...	157	164	7.00	7.525
Bartonville *K2*	139	151	...	157	164	7.00	7.55
Buffalo *W6*	...	...	...	...	...	6.90	7.30
Chicago, Ill. *N4*	137	149	...	155	162	6.90	7.45
Cleveland *A6*	142	...	...	...	...	...	...
Cleveland *A5*	...	...	...	...	...	6.90	...
Crawfordsville *M4*	139	151	...	157	159	7.00	7.55
Donora, Pa. *A5*	137	146	...	155	159	6.90	7.30
Duluth *A5*	137	146	150	155	159	6.90	7.30
Fairfield, Ala. *T2*	137	146	...	155	159	6.90	7.30
Galveston *D4*	139	...	...	...	...	...	...
Houston *S2*	145	154	...	...	167	7.30	7.70
Johnstown, Pa. *B3*	137	149	...	...	162	6.90	7.45
Joliet, Ill. *A5*	137	146	...	155	159	6.90	7.30
Kokomo, Ind. *C9*	139	148	...	157	161	7.00	7.55
Los Angeles *B2*	...	...	...	...	...	7.85	...
Kansas City *S2*	148	158	...	167	171	7.50	7.90
Minnequa *C6*	142	156	150	160	168	7.15	7.55
Monessen *P6*	137	151	...	...	163	6.90	7.45
Moline, Ill. *R3*	...	...	145	...	...	...	...
Pittsburg, Cal. *C7*	156	169	...	179	179	7.85	8.25
Portsmouth *P7*	...	...	...	...	...	6.90	7.30
Rankin, Pa. *A5*	137	146	...	...	159	6.90	7.30
So. Chicago *R3*	137	146	145	155	159	6.90	7.30
S. San Francisco *C6*	...	...	...	...	179	...	...
Sparrows Pt. *B3*	139	...	...	157	164	7.00	7.55
Struthers, O. *Y1*	...	...	...	...	...	6.90	7.55
Worcester *A5*	143	...	...	...	...	7.20	...
Williamsport, Pa. *S5*	...	...	150	...	...	...	...

Cut Nails, carloads, base $8.30 per keg at Conshohocken, Pa. (*A2*).

* Alabama City and So. Chicago don't include zinc extra Galvanized products computed with zinc at 11.0¢ per lb

C-R SPRING STEEL

Cents Per Lb F.o.b. Mill	CARBON CONTENT 0.26-0.40	0.41-0.60	0.61-0.80	0.81-1.05	1.06-1.35
Bridgeport, Conn. *S7* *	5.75	8.05	9.00	11.15	13.85
Buffalo, N. Y. *R7*	5.75	8.05	9.00	10.95	13.25
Carnegie, Pa. *S9*	.....	8.05	9.00	11.15	13.85
Cleveland *A5*	5.75	8.05	9.00	11.15	13.85
Detroit *D1*	5.90	8.25	9.20	10.95	.....
Detroit *D2*	5.90	8.25	9.20	.....	.....
Harrison, N. J. *C11*	.....	.....	9.30	11.45	14.15
Indianapolis *C5*	5.75	8.05	9.00	10.95	.....
New Castle, Pa. *B4*	5.75	8.05	9.00	10.95	.....
New Haven, Conn. *D1*	6.20	8.35	9.30	11.25	.....
Pawtucket, R. I. *N7*	6.30	8.35	9.30	11.45	14.15
Riverdale, Ill. *A1*	5.85	8.05	9.00	11.15	13.85
Sharon, Pa. *S1*	5.75	8.05	9.00	11.15	13.85
Trenton *R4*	.....	8.35	9.30	11.25	13.40
Wallingford *W1*	6.20	8.35	9.30	11.45	14.15
Warren, Ohio *T4*	5.75	8.05	9.00	10.95	13.25
Weirton, W. Va. *W3*	5.85	8.05	9.00	10.95	13.25
Worcester, Mass. *A5*	6.60	8.35	9.30	11.45	14.15
Youngstown *C5*	5.75	8.05	9.00	10.95	.....

* Sold on Pittsburgh base.

BOILER TUBES

$ per 100 ft. carload lots, cut 10 to 24 ft. F.o.b. Mill	Size OD-In.	Size B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.	Elec. Weld C.D.
Babcock & Wilcox	2	13	28.33	33.97	27.48	32.95
	2½	12	38.15	45.74	37.00	44.36
	3	12	44.05	52.82	42.72	51.23
	3½	11	51.43	61.66	49.88	59.81
	4	10	68.29	81.88	66.24	79.42
National Tube	2	13	28.33	33.97	27.48	.....
	2½	12	38.15	45.74	37.00	.....
	3	12	44.05	52.82	42.72	.....
	3½	11	51.43	61.66	49.88	.....
	4	10	68.29	81.88	66.24	.....
Pittsburgh Steel	2	13	28.33	33.97	.....	.....
	2½	12	38.15	45.74	.....	.....
	3	12	44.05	52.82	.....	.....
	3½	11	51.43	61.66	.....	.....
	4	10	68.29	81.88	.....	.....

WAREHOUSES

Base price, f.o.b., dollars per 100 lb.

Cities	City Delivery Charge	Sheets Hot-Rolled	Sheets Cold-Rolled (15 gage)	Sheets Galvanized (10 gage)	Strip Hot-Rolled	Strip Cold-Rolled	Plates	Shapes Standard Structural	Bars Hot-Rolled	Bars Cold-Finished	Alloy Bars Hot-Rolled A 4615 As Rolled	Alloy Bars Hot-Rolled A 4140 Annealed	Alloy Bars Cold-Drawn A 4615 As Rolled	Alloy Bars Cold-Drawn A 4140 Annealed
Baltimore	$.20	6.22	7.51	7.78	6.89	.....	6.57	6.92	6.88	8.52	.....	.....	.....	.....
Birmingham	.15	6.35–6.50	7.35–8.10	8.25–9.00	6.60	9.60	6.65	6.65	6.50	9.00	.....	.....	.....	.....
Boston	.10	7.23	8.23	9.42–9.52	7.47	9.65–9.85	7.34–7.37	7.49	7.20	8.60–8.70	12.60–12.80	12.45–12.46	15.15	15.10
Buffalo	.20	6.35–6.40	7.40[3] 7.45	8.80–8.84	6.70–6.75	.....	6.65–6.70	6.70–6.77	6.50–6.55	7.85[3] 7.90	12.50	12.15[3]	14.85	14.75–14.80[3]
Chicago	.20	6.38	7.38	8.30	6.62	.....	6.52	6.69	6.51	7.50	12.25	11.90	14.60	14.55
Cincinnati	.15	6.49–6.53	7.37–7.42	8.25–8.30	6.86–6.91	.....	6.81–6.86	6.91	6.75–6.80	7.80–7.85	12.55	12.15–12.20	14.90	14.80–14.85
Cleveland	.20	6.38	7.38	8.45	6.72	.....	6.69	7.02	6.57	7.60	11.96	.....	.....	14.61
Denver		7.85	8.85	10.02	8.20	.....	7.95	7.95	8.05	9.05	.....	.....	.....	.....
Detroit	.20	6.57	7.57	8.50–8.58	6.90	.....	6.80–6.85	7.16	6.79	7.77	12.45	12.10	14.80	14.75
Houston	.20	7.35	7.65–7.80	9.93	7.70	.....	7.35	7.60	7.70	9.50–9.60	.....	13.10	.....	.....
Kansas City	.20	7.05	8.05	8.95	7.29	.....	7.19	7.36	7.18	8.07–8.27	.....	12.27	.....	.....
Los Angeles	.20	7.40	9.25	9.55–9.85	7.75	.....	7.35	7.55	7.35–7.45	10.05	.....	13.20	.....	16.35
Memphis	.10	6.79	7.69	.....	6.90	.....	7.01	7.09	6.88	8.24	.....	.....	.....	.....
Milwaukee	.20	6.47	7.47	8.21–8.39	6.71	.....	6.61	6.86	6.60	7.69	12.34	11.99	14.69	14.64–14.84
New Orleans	.15	6.70	7.65	9.23	6.80	.....	6.90–6.95	7.05	6.80	8.70–10.70	.....	.....	.....	.....
New York	.10	6.97–6.98	7.78–8.46	8.79[1] 8.99	7.36–7.56	.....	7.18–7.27	7.13–7.38	7.30–7.37	8.63–8.73[2]	12.63	12.28	.....	14.93
Norfolk	.20	7.00	.....	.....	7.10	.....	7.10	7.10	7.10	8.60	.....	.....	.....	.....
Philadelphia	.10	6.19	7.29[3]	8.09[4] 8.23	6.96	.....	6.49	6.54	6.74	8.19[3]	.....	11.66–11.96[3]	.....	14.61[3]
Pittsburgh	.20	6.38	7.38	8.30–8.50	6.72–6.75	.....	6.52	6.69	6.51	7.85	12.25	11.90	14.60	14.55
Portland	.20	7.60	8.75	9.05	7.85	.....	7.45	7.50	7.55	10.95	.....	.....	.....	.....
Salt Lake City	.20	7.65	10.20	10.70	9.05	.....	7.70	7.70–8.85	8.80	10.95	.....	.....	.....	.....
San Francisco	.20	7.55	8.95	9.35–9.85	7.80	.....	7.40	7.50	7.35	10.05	.....	13.20	.....	16.35
Seattle	.00	8.10	9.80	10.15	8.20	.....	7.80	7.75	7.80	10.95	.....	13.65	.....	16.30
St. Louis	.20	6.62–6.67	7.67	8.54–8.59	6.91	.....	6.81	7.09	6.80	7.89	12.54	12.19	14.84–14.89	14.45–14.84
St. Paul	.15	7.03	8.03–8.58	8.96	7.28	.....	7.19	7.35	7.16	8.26	.....	12.56	.....	15.21

Base Quantities (Standard unless otherwise keyed): Cold finished bars; 2000 lb or over. Alloy bars; 1000 to 1999 lb. All others; 2000 to 9999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may not be combined with each other or with galvanized sheets for quantity.

Exceptions: (1) 1500 to 9999 lb. (2) 1000 lb or over. (3) $.25 delivery. (4) 1000 to 1999 lb, $.25 delivery.

Miscellaneous Prices

(Effective Aug. 31, 1954)

TOOL STEEL

F.o.b. Mill

W	Cr	V	Mo	Co	Base per lb
18	4	1	—	—	$1.54
18	4	1	—	5	2.185
18	4	2	—	—	1.705
1.5	4	1.5	8	—	.90
6	4	2	6	—	1.29

High-carbon chromium ..... .73
Oil hardened manganese ..... .405
Special carbon ..... .37
Extra carbon ..... .31
Regular carbon ..... .26

Warehouse prices on and east of Mississippi are 3.5¢ per lb higher. West of Mississippi, 5.5¢ higher.

CAST IRON WATER PIPE

	Per Net Ton
6 to 24-in., del'd Chicago	$111.80 to $115.30
6 to 24-in., del'd N. Y...	115.00 to 116.00
6 to 24-in., Birmingham	98.00 to 102.50
6-in. and larger f.o.b. cars, San Francisco, Los Angeles, for all rail shipments; rail and water shipments less	$129.50 to $131.50

Class "A" and gas pipe, $5 extra; 4-in. pipe is $5 a ton above 6-in.

LAKE SUPERIOR ORES

51.50% Fe; natural content, delivered lower Lake ports. Prices effective July 1, 1953, to end of 1954 season.

	Gross Ton
Openhearth lump	$11.15
Old range, bessemer	10.30
Old range, nonbessemer	10.15
Mesabi, bessemer	10.05
Mesabi, nonbessemer	9.90
High phosphorus	9.90

Prices based on upper Lakes rail freight rates, Lake vessel freight rates, handling and unloading charges, and taxes thereon, in effect on June 24, 1953. Increases or decreases after such date are for buyer's account.

COKE

	Net-Ton
Furnace, beehive (f.o.b. oven) Connellsville, Pa.	$14.25 to $14.50
Foundry, beehive (f.o.b. oven) Connellsville, Pa.	$16.50 to $17.00
Foundry, oven coke	
Buffalo, del'd	$28.08
Chicago, f.o.b.	24.50
Detroit, f.o.b.	25.50
New England, del'd	26.05
Seaboard, N. J., f.o.b.	24.00
Philadelphia, f.o.b.	23.00
Swedeland, Pa., f.o.b.	23.00
Painesville, Ohio, f.o.b.	25.50
Erie, Pa., f.o.b.	25.00
Cleveland, del'd	27.43
Cincinnati, del'd	26.56
St. Paul, f.o.b.	23.75
St. Louis, f.o.b.	26.00
Birmingham, f.o.b.	22.65
Lone Star, Tex., f.o.b.	18.50

ELECTRODES

Cents per lb, f.o.b. plant, threaded, with nipples, unboxed

GRAPHITE			CARBON		
Diam. (In.)	Length (In.)	Price	Diam. (In.)	Length (In.)	Price
24	84	20.50	40	100, 110	8.95
20	72	20.00	35	110	8.95
12 to 18	72	20.50	30	110	8.95
7 to 10	60	21.00	24	72 to 84	9.10
6	60	23.25	20	90	8.95
4	40	26.00	17	72	9.10
3	40	27.25	14	72	9.50
2½	30	28.00	10, 12	60	10.30
2	24	43.50	8	60	10.55

BOLTS, NUTS, RIVETS, SCREWS

(Base discount, f.o.b. mill)

Machine and Carriage Bolts

	Discount Less Case	C.
½ in. & smaller x 4 in. & shorter	2	22
½ in. & smaller x 6 in. & shorter	+3	18
9/16 in. & ⅝ in. x 6 in. & shorter	+4	17
¾ in. & larger x 6 in. & shorter	+6	15
All diam. longer than 6 in.	+15	8
½ in. & smaller x 6 in. & shorter	+3	18
Lag, all diam. x 6 in. & shorter	6	25
Lag, all diam. longer than 6 in.	+2	19
Plow bolts	23	23

Stove Bolts

Packaged, package list ..... 44½—10
Bulk, bulk list* 59

*Minimum quantity per item: 15,000 pieces lengths to 3"; 5,000 pieces lengths over 3". Special finishes: Zinc, Parkerized, cadmium or nickel add 6¢ per lb net. Black oil finish add 2¢ per lb net.

Nuts, H.P., C.P., reg. & hvy.

	Base Discount	Discount, Case or Keg
¾" or smaller	55	64
⅞" to 1⅛" inclusive	58	66
1¼" to 1½" inclusive	60	67½

C.P. Hex regular & hvy.

All sizes	55	64

Hot Galv. Nuts (all types)

¾" or smaller	38	50
⅞" to 1½" inclusive	41	52½

Finished, Semi-finished, Slotted or Castellated Nuts

All sizes	55	66

Rivets

	Base per 100 lb
½ in. & larger	$9.25
	Pct Off List
7/16 in. and smaller	37

Cap Screws

	Discount Bright	H.C. Heat Treated
New std. hex head, packaged ⅝" x 6" and smaller and shorter	38	28
¾", ⅞", 1" x 6" and shorter	15	1
New std. hex head, bulk* ⅝" x 6" and smaller and shorter	50	42
¾", ⅞", 1" x 6" and shorter	32	21

*Minimum quantity per item:
15,000 pieces ¼", 5/16", ⅜" diam.
5,000 pieces 7/16", ½", 9/16", ⅝" diam.
2,000 pieces ¾", ⅞", 1" diam.

Machine Screws

	Discount
Packaged, gross list	44½—10
Bulk, bulk list*	17

*Minimum bulk quantity, 15,000 pieces per item.

Machine Screw & Stove Bolt Nuts

Packaged, package list	36—10
Bulk, bulk list*	17

*Minimum bulk quantity, 15,000 pieces per item.

REFRACTORIES

Fire Clay Brick

Carloads per 1000

First quality, Ill., Ky., Md., Mo., Ohio, Pa. (except Salina, Pa., add $5.00)	$109.00
No. 1 Ohio	102.00
Sec. quality, Pa., Md., Ky., Mo., Ill.	102.00
No. 2 Ohio	93.00
Ground fire clay, net ton, bulk (except Salina, Pa., add $1.50)	16.00

Silica Brick

Mt. Union, Pa., Ensley, Ala.	$115.00
Childs, Hays, Pa.	120.00
Chicago District	125.00
Western Utah	131.00
California	138.00
Super Duty Hays, Pa., Athens, Tex., Windham	132.00
Curtner, Calif.	150.00
Silica cement, net ton, bulk, Eastern (except Hays, Pa.)	19.00
Silica cement, net ton, bulk, Hays, Pa.	21.00
Silica cement, net ton, bulk, Chicago District, Ensley, Ala.	20.00
Silica cement, net ton, bulk, Utah and Calif.	28.50

Chrome Brick

Per net ton

Standard chemically bonded Balt.	$86.00
Standard chemically bonded, Curtner, Calif.	96.25
Burned, Balt.	80.00

Magnesite Brick

Standard Baltimore	$109.00
Chemically bonded, Baltimore	97.50

Grain Magnesite

St. ⅝-in. grains

Domestic, f.o.b. Baltimore in bulk fines removed	$64.40
Domestic, f.o.b. Chewalah, Wash., Luning, Nev. in bulk	38.00
in sacks	43.75

Dead Burned Dolomite

Per net ton

F.o.b. bulk, producing points in: Pa., W. Va., Ohio	$14.50
Midwest	14.60
Missouri Valley	13.65

FLUORSPAR

Washed gravel, f.o.b. Rosiclaire, Ill. Price, net ton; effective CaF_2 content

72½%	$44.00
70% or more	42.50
60% or less	38.00

METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh.

Swedish sponge iron c.i.f. New York, ocean bags	11.25¢
Canadian sponge iron, Del'd in East	12.0¢
F.o.b. ship. pt., carloads	9.5¢
Domestic sponge iron, 98+% Fe, carload lots	18.0¢
Electrolytic iron, annealed, 99.5+% Fe	38.0¢
Electrolytic iron, unannealed, minus 325 mesh, 99+% Fe	53.5¢
Hydrogen reduced iron minus 300 mesh, 98+% Fe	63.0¢ to 80.0¢
Carbonyl iron, size 5 to 10 mieron, 98%, 00.8+% Fe	83.0¢ to $1.48
Aluminum	31.5¢
Brass, 10 ton lots	29.50¢ to 36.50¢
Copper, electrolytic	43.50¢
Copper, reduced	43.50¢
Cadmium, 100-199 lb. 95¢ plus metal value	
Chromium, electrolytic, 99% min., and quality, del'd	$3.60
Lead	21.00¢
Manganese	57.0¢
Molybdenum, 99%	$2.75
Nickel, unannealed	89.50¢
Nickel, annealed	96.50¢
Nickel, spherical, unannealed	93.50¢
Silicon	43.50¢
Solder powder	7.0¢ to 9.0¢ plus met. value
Stainless steel, 302	91.0¢
Stainless steel, 316	$1.10
Tin	14.04¢ plus metal value
Tungsten, 99% (65 mesh)	$4.05
Zinc, 10 ton lots	17.5¢ to 25.0¢

Ferroalloy Prices

(Effective Aug. 31, 1954)

Ferrochrome

Contract prices, cents per lb contained Cr, lump, bulk, carloads, del'd, 65-72% Cr, 2% max Si.

0.025% C ...	36.00	0.15% C ...	33.75
0.025% C, Simplex ...	34.50	0.20% C ...	33.50
		0.50% C ...	33.25
0.06% C ...	34.50	1.00% C ...	33.00
0.10% C ...	34.00	2.00% C ...	32.75

65-69% Cr, 4-9% C 24.75
62-66% Cr, 4-6% C, 6-9% Si 25.60

S. M. Ferrochrome

Contract prices, cents per pound, chromium contained, lump size, delivered.

High carbon type: 60.65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.

Carloads 25.85
Ton lots 28.00
Less ton lots 29.50

High-Nitrogen Ferrochrome

Low-carbon type 67-72% Cr, 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome price schedule. Add 3¢ for each additional 0.25% of N.

Chromium Metal

Contract prices, per lb chromium contained, packed, delivered, ton lots, 97% min. Cr, 1% max. Fe.

0.10 max. C $1.18
0.50% max. C 1.14
9 to 11% C 1.11

Low Carbon Ferrochrome Silicon

(Cr 34-41%, Si 42-49%, C 0.05% max.) Contract price, carloads, f.o.b. Niagara Falls, freight allowed, lump 4-in. x down, 24.75¢ per lb contained Cr plus 10.80¢ per lb contained Si. Bulk 2-in. x down, 25.05¢ per lb contained Cr plus 10.80¢ per lb contained Si. Bulk 1-in. x down, 25.25¢ per lb contained Cr plus 11.00¢ per lb contained Si.

Calcium-Silicon

Contract price per lb of alloy, lump, delivered.

30-33% Cr, 60-65% Si, 3.00 max. Fe.

Carloads 19.00
Ton lots 22.10
Less ton lots 23.60

Calcium-Manganese—Silicon

Contract prices, cents per lb of alloy, lump, delivered.

16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads 20.00
Ton lots 22.30
Less ton lots 23.30

SMZ

Contract prices, cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe ½ in. x 12 mesh.

Ton lots 17.50
Less ton lots 19.50

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5; 38-42% Cr, 17-19% Si, 8-11% Mn, packed.

Carload lots 16.60
Ton lots 18.10
Less ton lots 19.35

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. Si 48 to 52%: Ti 9 to 11%, Ca 5 to 7%.

Carload packed 17.50
Ton lots to carload packed 18.50
Less ton lots 20.00

Ferromanganese

Maximum contract base price, f.o.b., lump size, base content 74 to 76 pct Mn; Producing Point — Cents per-lb

Marrietta, Ashtabula, O.; Alloy, W. Va.; Sheffield, Ala.; Portland, Ore. 10.00
Clairton, Pa. 10.00
Sheridan, Pa. 10.00
Philo, Ohio 10.00

Add or subtract 0.1¢ for each 1 pct Mn above or below base content.

Briquets, delivered, 66 pct Mn:

Carloads, bulk 12.50
Ton lots packed 14.05

Spiegeleisen

Contract prices, per gross ton, lump, f.o.b. Palmerton, Pa.

Manganese	Silicon	
16 to 19%	3% max.	$84.00
19 to 21%	3% max.	86.00
21 to 23%	3% max.	88.50
23 to 25%	3% max.	91.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.

95.50% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.

Carload, packed 36.95
Ton lots 38.45

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.

Carloads 30.00
Ton lots 32.00
250 to 1999 lb 34.00
Premium for hydrogen-removed metal 0.75

Medium Carbon Ferromanganese

Mn 80% to 85%, C 1.25 to 1.50. Contract price, carloads, lump, bulk, delivered, per lb of contained Mn ..... 21.35¢

Low-Carb Ferromanganese

Contract price, cents per pound Mn contained, lump size, del'd Mn 85-90%.

	Carloads	Ton	Less
0.07% max. C, 0.06% P, 90% Mn ...	30.00	31.85	33.05
0.07% max. C ...	27.95	29.80	31.00
0.15% max. C ...	27.45	29.30	30.50
0.30% max. C ...	26.95	28.80	30.00
0.50% max. C ...	26.45	28.30	29.50
0.75% max. C, 80-85% Mn, 5.0-7.0% Si ...	23.45	25.30	26.50

Silicomanganese

Contract basis, lump size, cents per pound of metal, delivered, 65-68% Mn, 18-20% Si, 1.5% max. C for 2% max. C, deduct 0.2¢.

Carload bulk 11.00
Ton lots 12.65
Briquet contract basis carlots, bulk, delivered, per lb of briquet 12.65
Ton lots, packed 14.25

Silvery Iron (electric furnace)

Si 14.01 to 14.50 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $92.00 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $89.50. Add $1.00 per ton for each additional 0.50% Si up to and including 17%. Add $1.45 for each 0.50% Mn over 1%.

Silicon Metal

Contract price, cents per pound contained Si, lump size, delivered, packed.

	Ton lots	Carloads
96% Si, 2% Fe ...	20.10	18.00
97% Si, 1% Fe ...	20.60	18.50

Silicon Briquets

Contract price, cents per pound of briquets, bulk, delivered, 40% Si, 2 lb Si briquets.

Carloads, bulk 6.30
Ton lots 7.90

Electric Ferrosilicon

Contract price, cents per lb contained Si, lump, bulk, carloads, delivered.

25% Si ...	20.00	75% Si ...	13.80
60% Si ...	16.80	85% Si ...	15.55
65% Si ...	12.20	90.55% Si ...	17.00

Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots ...	$2.05	$2.95	$3.75
Less ton lots	2.40	3.30	4.55

Ferrovanadium

35-55% contract, basis, delivered, per pound, contained V.

Openhearth ..... $3.00-$3.10
Crucible 3.10- 3.20
High speed steel (Primos) .. 3.20- 3.25

Alsifer, 20% Al, 40% Si, 40% Fe,

Contract basis, f.o.b. Suspension Bridge, N. Y., per lb.

Carloads ..... 9.25¢
Ton lots 10.15

Calcium molybdate, 46.3-46.6%

f.o.b. Langeloth, Pa., per pound contained Mo $1.15

Ferrocolumbium, 50-60%, 2 in. x D contract basis, delivered

per pound contained Cb.

Ton lots $9.50
Less ton lots 9.55

Ferro-tantalum-columbium, 20%

Ta, 40% Cb, 0.30% C, contract basis, del'd, ton lots, 2-in. x D per lb cont'd Cb plus Ta... $4.75

Ferromolybdenum, 55-75%, f.o.b.

Langeloth, Pa., per pound contained Mo. $1.32

Ferrophosphorus, electric, 23-26%, car lots, f.o.b. Siglo, Mt.

Pleasant, Tenn., $4.00 unitage, per gross ton $90.00
10 tons to less carload $110.00

Ferrotitanium, 40% regular grade,

0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti..... $1.35

Ferrotitanium, 25% low carbon,

0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti $1.50
Less ton lots 1.55

Ferrotitanium, 15 to 18% high

carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload, per net ton $177.00

Ferrotungsten, ¼ x down,

packed, per pound contained W. ton lots, f.o.b. $3.80

Molybdic oxide, briquets or cans,

per lb contained Mo, f.o.b. Langeloth, Pa. $1.14
bags, f.o.b. Washington, Pa., Langeloth, Pa. $1.12

Simanal, 20% Si, 20%Mn, 20%

Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per lb.

Carload, bulk, lump ..... 15.50¢
Ton lots, packed lump ..... 16.75¢
Less ton lots, lump, packed 17.25¢

Vanadium Pentoxide, 86-89%

V_2O_5 contract basis, per pound contained V_2O_5 ..... $1.29

Zirconium, contract basis, per lb of alloy

35-40%, f.o.b., freight allowed, ton lots ..... 26.00¢
12-15%, del'd, lump, bulk-carloads ..... 8.00¢

Boron Agents

Borosil, contract prices per lb of

alloy del. f.o.b. Philo, Ohio, freight allowed. B, 314%, Si, 40-45%, per lb contained B.... $5.25

Bortam, f.o.b. Niagara Falls

Ton lots, per pound ..... 45¢
Less ton lots, per pound.... 50¢

Corbortam, Ti 15-21%, B 1-2%

Si 2-4%, Al 1-2%, C 4.5-7.5%, f.o.b. Suspension Bridge, N. Y., freight allowed.

Ton lots per pound ..... 10.00¢

Ferroboron, 17.50% min. B, 1.50%

max. Si, 0.50% max. Al, 0.50% max. C, 1 in., x D, Ton lots... $1.20
F.o.b. Wash., Pa.; 100 lb up .35
10 to 14% B 1.20
14 to 19% B 1.50
19% min. B .....

Grainal, f.o.b. Bridgeville, Pa.,

freight allowed, 100 lb and over

No. 1 ..... $1.00
No. 6 ..... 63¢
No. 79 ..... 50¢

Manganese-Boron, 75.00% Mn,

15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd. $1.46

Ton lots 1.57
Less ton lots .....

Nickel-Boron, 15-18% B, 1.00%

max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, del'd, less ton lots $2.05

Silcaz, Contract basis, delivered

Ton lots ..... 45.00¢

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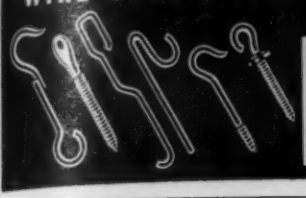

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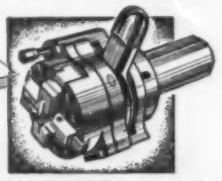

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No. 3A WARNER & SWASEY Turret Lathe, Timken Spindle, electric chuck, tooling
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THE CLEARING HOUSE

News of Used and Rebuilt Machinery

Sell Smaller Tools . . . Cleveland area used machinery sales are showing a few spurts here and there on small tools, but overall business remains slow with prices firm.

Most of the spurt on smaller used tools is coming from government work, especially aircraft. According to the sales manager of one firm specializing in small lathes, shapers, mills, reamers, cutters and arbor presses, these sales flurries are mostly from firms doing experimental work, principally aircraft development.

Customers getting into this are both large and small including stove manufacturers, jet engine and reciprocating engine parts manufacturers.

Prices Stay Put . . . On larger equipment, prices have remained firm despite relatively slow business with many customers deciding on purchase of new equipment because of the small price spread. Some pre-World War II machines are going for as high as 75-80 pct of the cost of brand new equipment.

Hardest-to-get used machines which bring top prices are gear hobbers, late model lathes, heavy duty press brakes and mills. Dovetail type gear hobbers, press brakes in the 8-12 ft range (10 gage and up) are very scarce and command good prices when obtainable.

Dealers Merge . . . Three used machinery firms merged into one were going into business in Cleveland last week with a combined inventory of about $250,000. Acme Tool and Machinery Co., joined by Cleveland Tool aand Engineering and Thomas Machinery & Supply Co., became the largest Cleveland dealer in used cutting tools as well as a heavy factor in machine accessories, gages and regular machine tools.

New president of Acme is R. J. Bradley, formerly president of Cleveland Tool. Vice-president is Frank Thomas of Thomas Machinery & Supply. Charles Cachat, former president of Acme, one of Cleveland's pioneer machine tool firms, has retired.

Cleveland Tool had specialized in machine accessories and its addition is expected to give Acme new strength in this field. Thomas Machinery specialized in cutting tools, an area in which Acme has also been a major operator, and their combined sales potential is expected to make Acme largest local firm in this field.

Midwest Awaits Upturn . . . Waiting out the summer sales doldrums and hoping for the fall upturn seems to be the almost universal occupation of used machinery dealers in the Chicago-Milwaukee area. The slow August business that most dealers said they were expecting more than 2 months ago became a discouraging reality.

Dealers are pinning their hopes on a more active market during the final quarter to fill out the plus sides of their balance sheets. The optimistic feelings of those dealers who at the end of June commenced a moderate inventory buildup have given way to a definite "We'll wait and see" attitude.

A minority of Chicago dealers, and those with the most years in the trade, feel that it's unwise to bank too heavily on a major upturn even in the traditional fall pickup months of October-November.

Dollar volume has been bolstered to some extent by a constant trickle of heavy equipment sales.

Vacation period just coming to a close is the factor which most dealers believe responsible for the sharper-than-expected decline in lighter equipment sales.